GEORGIA
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December, 1945

EDISON ELECTRIC INSTITUTE BULLETIN

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

September, 1944 and 1945

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1945	1944	%
GENERATION* (Net)			
By Fuel Burning Plants	10,983,216,000	13,124,543,000	−16.3
By Water Power Plants	6,032,458,000	5,391,603,000	+11.9
Total Generation	**17,015,674,000**	**18,516,146,000**	**− 8.1**
Add—Net Imports Over International Boundaries	138,398,000	139,252,000	− 0.6
Less—Company Use	119,660,000	128,040,000	− 6.5
Less—Energy Used by Producer	107,823,000	170,527,000	−36.8
Net Energy for Distribution	**16,926,589,000**	**18,356,831,000**	**− 7.8**
Losses and Unaccounted for	2,036,346,000	2,097,130,000	− 2.9
Sales to Ultimate Customers	**14,890,243,000**	**16,259,701,000**	**− 8.4**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of September 30th			
Residential or Domestic	27,957,711	27,305,432	+ 2.4
Rural (Distinct Rural Rates)	1,207,666	1,134,400	.....
Commercial or Industrial:			
Small Light and Power	4,321,459	4,239,363	+ 2.5
Large Light and Power	180,939	152,770	
Other Customers	117,743	116,387	.....
Total Ultimate Customers	**33,785,518**	**32,948,352**	**+ 2.5**
KILOWATTHOUR SALES—During the Month of September			
Residential or Domestic	2,692,654,000	2,483,498,000	+ 8.4
Rural (Distinct Rural Rates)	382,519,000	358,211,000	+ 6.8
Commercial or Industrial:			
Small Light and Power	2,477,248,000	2,526,729,000	− 2.0
Large Light and Power	8,023,316,000	9,503,880,000	−15.6
Street and Highway Lighting	174,655,000	173,958,000	+ 0.4
Other Public Authorities	562,136,000	624,495,000	−10.0
Railways and Railroads:			
Street and Interurban Railways	333,425,000	345,285,000	− 3.4
Electrified Steam Railroads	199,707,000	208,076,000	− 4.0
Interdepartmental	44,583,000	35,569,000	+25.3
Total to Ultimate Customers	**14,890,243,000**	**16,259,701,000**	**− 8.4**
Revenue from Ultimate Customers	**$267,913,400**	**$270,242,400**	**− 0.9**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—for 12 months ended September 30th			
Kilowatthours per Customer	1,202	1,132	+ 6.2
Average Annual Bill	$41.47	$40.07	+ 3.5
Revenue per Kilowatthour	3.45¢	3.54¢	− 2.5

(*) By courtesy of the Federal Power Commission.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 13 DECEMBER 1945 No. 12

Selling Is the Answer

By Charles A. Collier

Vice President, Georgia Power Company

Presented before the General Sales Conference of the Southeastern Electric Exchange in Atlanta, Georgia, December 5, 1945

LET'S start with five fundamental questions to which Selling Is the Answer:

I. The Answer to Destructive Competition

Let us see What is it you gentlemen and the industry generally are most afraid of? Be honest with yourselves—what is it that you are most afraid of? I think I can tell you what fear is uppermost in your minds: The fear of destructive competition through the construction and operation of unnecessary and undesirable public power projects. That, I would say, is your No. 1 fear.

Can you meet that threat with salesmanship? In my judgment, you cannot meet it in any other way. You can use all the paper and ink in America, and can write all the articles you want against such competition; you can give all the testimony on earth about it, but all will be wholly ineffective unless this industry does a complete, across-the-board selling job. For, after all, the determination as to whether you are going to face destructive competition is in the hands of John Q. Public. It is not a question of whether this or that Left-winger wants to install this or that "authority"—that doesn't determine it; it is not a question of whether this or that Senator or Congressman wants to make himself solid with his constituents that determines the answer; it is not the fact that maybe a river is running wastefully to the sea that determines it. The answer is determined, in the final analysis, by the rank and file of the American People, with particular reference to the people in the area proposed for the development. So why not sell those people on the principle that your company, not public power, is what they want?

Let's stop just a moment and analyze this.

What makes for low rates? Volume use? Selling! You cannot, under the profit system, achieve low rates and volume use in any other way. You cannot achieve a low cost for the service and you cannot give full value of benefits of the service, except through selling.

It is true, of course, that in order to be able to sell, you have to have an article or service that is meritorious; it is true that you must have the price right; it is true that you have to see that the goods and service perform after you get them into the customer's hands. But all of those things together won't make for full use of the service or the goods or the article unless some salesman has sparked the customer's mind, creating a belief that the service or commodity represents to him more comfort, convenience, and economy than he might obtain if he spent his dollar for something else.

The alleged absence of low rates, of volume use, and full utilization of the service, has furnished the spring-board for all, or nearly all, of the agitation for government construction and operation of electric systems. Yet broad application of the principles of salesmanship over the years would have forestalled the claim that public ownership was the only road to low rates, volume use, and full access to the benefits of electric service.

"In my humble judgement, the survival of the electrical industry as private enterprise may well depend upon the application of real salesmanship throughout this industry, not only in the selling of our goods but, along with it, the value of the service to the people in every community, seeing to it that our business is so conducted that there will be no attempt or urge on the part of any sensible man or woman to substitute some Federal bureaucracy in lieu of the business you gentlemen represent."

II. The Answer to Prosperity for the Industry

Now what is the second answer that salesmanship can give?

P. S. Arkwright made the statement many years ago that it didn't make a great deal of difference what happened, just so long as we were able to sustain the net earnings of the Company, since, with sustained net earnings, we always somehow worked out of every tight crack we seemed to get ourselves into. What is going to sustain those net earnings? Do you know of any way to sustain them except through salesmanship? If you do, I wish you would tell me, because salesmanship is hard work; it is work that goes on around the clock.

III. The Answer to Obtaining and Holding Public Approval

Another thing true salesmanship does: It assures the building and retention of public good-will. You can take yourself for an example. As a test case, review your experience with those businesses which in the last two or three years, have forgotten that salesmanship is a necessary ingredient. You still get the goods—of a sort; you still get the service, of a sort; but do you get them with a smile, and do you get them with an attitude on the part of the person with whom you deal that he is glad to have your patronage? No, you are often treated as though you are not wanted, as though your business is of no value to the individual to whom you want to give it. What is the result? Away back in your subconscious mind you are making up for yourself a black-list and saying to yourself: "I'll be damned if I will do

any business with that so-and-so when things get back to normal!" Many a business is going to find itself in a very unfavorable position when its competitors, who were smarter (and more considerate), are able to deliver the goods on which the other fellow now seems to have a monopoly. Salesmanship is the essence out of which good-will is built; it is the essence of public approval; and, after all, in our democracy, public approval is the condition precedent to our doing business!

IV. The Answer to Discharging the Debt of the Industry to Society

Now, there is another thing that salesmanship is capable of doing. I hold the theory that no business or individual who takes his or its livelihood out of a community and never puts anything back is serving his own best interest. As an example of what I mean, suppose you have a community from which your gross revenue is $100,000 per annum. Do you owe any debt to that community for the $100,000? I contend that you do. You have got to pay that debt by putting more back into that community than the bare-bone service you furnish; you have got to put back into it all the things that true salesmanship produces, looking toward the time when the things you put back will be converted into a greater era of prosperity and well-being for the people of that community and, incidentally, yourself—all of this over and above and beyond the mere kilowatthours which you may have delivered and sold. I give two simple proofs of this theory:

Did you ever hear of a water company, municipally owned, that enjoyed the good-will of the public? No, because it merely supplies a service for a price and never does anything beyond the contract!

Which is the greatest nation on earth in development of new lands and new countries? Old Mother England. And if you will read your history, you will find that the English have dominated the World picture, insofar as the development of new countries is concerned. Why? Because the emissaries they sent to the new countries were primarily super-salesmen; and no other country on earth has developed their new lands as they have. Your history will tell you that the Spanish were great colonizers. They were. But they *exploited* the countries, and they have lost every single one of them; now they do not have even a foothold in the Western Hemisphere, where the Portuguese also hold none, the Dutch hold two—and these, together with France, which holds two, were the great colonizing nations. All exploited the areas, they took out of their colonies all they possibly could, and they put nothing, relatively, back into them, and they have now lost virtually all of their Western Hemisphere possessions. From this you can see that your contribution to the community in which you operate yields fine returns—especially contributions of the kind made by Mother England beginning 500 years ago, and followed by her with hardly a break to the present day. And when Churchill said, "I was not elected Prime Minister to liquidate the British Empire," he knew what he was talking about! He knew he would not *have* to liquidate it, because (with a short exception in early Colonial times) the English have put back into their areas as much as they took out. Thus they welded their colonies (customers) into an empire, now more than 700 years old!

This is but a fraction of the part salesmanship has played in the world picture! It is aptly said, "Without the power of salesmanship and the power supplied by the men to the merchandising machine, the essential process of large-scale production of world-wide exchange would be an impossible thing. It is salesmanship that keeps the wheels of industry going the world over."

And it means just that to your community!

V. The Answer to the Up-building of Our Areas

We come to the fifth item of what salesmanship can do in supplying the answer—the answer down in this southeastern area of ours—poor, struggling, often lacking in economic leadership. What can we do, dubbed as we are, the Nation's No. 1 Economic Problem; an area out of which, for the last 40 years, much of the best blood has moved, for the lack of economic opportunity and for the lack of good, decent, environmental surroundings; an area that is becoming, unless we check it, relatively poorer every day. You are enjoying "war economy" now, but not in proportion to the rest of the nation, as you can learn from statistics of the Bureau of the Census. What can we do about it? Now, why not apply to your area the broad, all-encompassing principles of salesmanship —salesmanship not only of your company's product, but of the essentials that go to make for a sound economy and a good social structure, thus assuring the upbuilding of the areas in which you operate?

This country we are in is, in many respects, like a new country. Did you ever hear of a new country, a new frontier that was developed by anybody but salesmen? Think it over. Who developed the West? The salesmen, the James J. Hills. They weren't listed as salesmen on the payrolls, but they were salesmen just the same! Every new country must have its salesmen—or it never develops; without salesmanship it stagnates and finally sinks back to the economic wilderness that it was before the development began. If that be true of a new country, won't it be true also of a country long established?

All the virtues of salesmanship, however, are not encompassed in the five headings we have discussed. You know production and financing not so long ago were paramount, and salesmanship was secondary. Today, however, they have necessarily given 'way in the order of their importance to salesmanship, for today "distribution . . . determines not only the nature of production, but also its magnitude." You well remember what a magnificent job Industry did in the war effort. There is nothing in history to compare with that job. But how was Industry able to do it? Only because Industry had acquired the "know-how" of production through the prodding of the public by the salesmen of America, distributing more and more goods, of a better and better quality, at a lower and lower price. If it had not been for the salesmen creating the demand for goods, we would not have had the "know-how" of production. We would have been in the same predicament as Russia, where, from lack of an urge to create the demand, there was no opportunity for production to develop new ways and means for doing things quickly, efficiently and in volume. Since without demand there can be no production, the salesmen of America have just as much right to be proud of the production record of industry as the master mechanic of any plant in the land!

The problem today is not production —there *is* no problem in production. The problem is distribution, and distribution is synonymous with salesmanship. Salesmanship must create the demand or

we cannot expect the manufacturer to produce. What is the American Public going to do about all the goods and products we are manufacturing and setting on the shelves in the warehouses? How fast will it buy and take them out? How fast can the capital be turned that is tied up in raw materials? Ask the American salesman! They always come back to you and say, "What can YOU do with this product? We wonder, if we make it, can you sell it?" (They don't say, "We wonder, if you sell it, can we make it.") Our whole future course is charted by our answer to the question of how well will the salesman tell to the American Public the story of service and goods in volume, of high quality and at a reasonable price, convincing the American Public that they need this piece of goods or that service more than they need the dollar they have in savings or in prospect from earnings. The fullness of our answer will go far toward determining the future economy of our country.

In my humble judgment, the survival of the electrical industry as private enterprise may well depend upon the application of real salesmanship throughout this industry, not only in the selling of our goods but, along with it, the value of the service to the people in every community, seeing to it that our business is so conducted that there will be no attempt or urge on the part of any sensible man or woman to substitute some Federal bureaucracy in lieu of the business you gentlemen represent. We must quarrel more with ourselves and less with parts of our uninformed public when we let agitation for public ownership arise. Did you ever think that it does arise because, over the last couple of decades, we have not done as complete, full and efficient a job of selling our services to the American Public as the American Public thinks we should have done?

We can have the low rates, we can have the good will that government ownership claims—we can have all of that, and all the good things that private enterprise contributes in addition—IF we will but build the volume of business that our companies are capable of doing, upon a basis of quality, service, low cost, and thoughtful consideration for our customers, and make our proper contribution to the social and economic welfare of the communities we serve; and, if you do not do it on that basis, all the paper —as I said before—and all the ink, and all the appearances before committees of the Congress are going to have no more effect upon the final result than pouring water on a duck's back. You have ONE sure way out.

There is no substitute for salesmanship. Absolutely none. But it must be well directed and long sustained. One of the old Arab proverbs is here particularly applicable. It seems there was a rough, winding road across the desert—a long way, full of trials and tribulations and hard plodding. But the old Arabs, trading with their neighbors across the desert, crossed on this road to their advantage for many years. A newcomer once went out with them, and, when returning, said, "That is a terribly difficult road. Isn't there a short road, free of all these difficulties and miseries?" The old, old Arab answered, "My son, there is no short, easy road across the desert."

There is no short, easy road to successful development of permanent business—a business that will last through the "ups" and "downs" of the economic cycle. But salesmanship of a high order, sustained over a long period of time, will make "the road across the desert" a much easier and shorter one.

Now, "the work of building can't stop, it must go on!" "Nothing ever stands still, and nothing lasts so very long;" so don't rest with the good things you HAVE done. And remember too, that GOOD WILL is a fine thing to use, but not a fine thing to USE UP. So don't use it UP by coasting, and don't fail through inferiority complexes, or being ridden by the old witch of Fear. For, if you do fail, and the Industry does not find someone else to do your job for you, then you may be sure the Industry will fail too!

I know you can do the job—so let's get at it.

Initial Elements Ready Now—

a Complete Sales Training Course for the Electrical Industry

When a man has finished this course he is ready to sell *anything*.

It starts right down at bedrock, and provides a firm foundation in such fundamentals as:

The workings of cause and effect in selling

How to make the most economical use of selling time

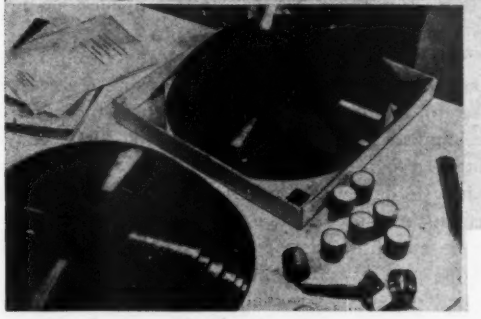
How to view the sale through the eyes of the customer, and say the right thing at the right time

How to arrange sales arguments in a logical pattern, and keep out unrelated facts

After providing this basic training, the course progresses to specific fields and specific selling jobs.

Every step of the way to the sale in every type of market is closely defined in this complete Sales Training Program.

Eight Basic Training Meetings, plus 10 Meetings on Applied Residential, Commercial, Industrial, and Rural Selling



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EDISON ELECTRIC INSTITUTE, 420 LEXINGTON AVE., NEW YORK 17, N. Y.

Electrical Industry Sales Training Program Ready This Month

THE initial elements in the electrical industry Sales Training Program, the most comprehensive and far-reaching training program ever undertaken for the benefit of the entire industry, will be ready for delivery and use by electric power companies, manufacturers, wholesalers, dealers, and other branches of the industry, in late December.

It consists of a course of 18 sound-slide films, an equal number of silent trailer films, with salesmen's manuals and leader's guides to accompany each film. This program will provide rapid, thorough training for the host of new salesmen with little or no sales experience, and will prove invaluable as a refresher course for older salesmen and returning veterans of the armed forces.

The program is suitable for training the sales forces of manufacturers, wholesalers, contractors, dealers, and utility companies. Trained salesmen will make an important contribution to the economic health of the nation. Because of the sharply competitive market, the training of electrical industry salesmen should be second to none in the selling field.

Produced by Vocafilm Corporation, under the supervision of the Institute's Sales Training Committee, in cooperation with the National Electrical Wholesalers Association, the course employs the same techniques applied successfully by Vocafilm in the production of training films for the Army and Navy. These dramatic presentations expedite thorough and comprehensive instructions.

The first eight Basic Sales Training meetings cover the fundamentals of sales technique such as how to make the most economical use of selling time, how to view the sale through the eyes of the customer and say the right thing at the right time, and how to arrange sales presentations in a logical pattern. Sound slide films analyze the basic impulses behind every sale, how to obtain recognition of the prospect's need, how to demonstrate and prove the benefits of the electric appliance, and how to establish the prestige and quality of the product and the firm.

After providing this basic training, the Program progresses to the application of those techniques to selling specific services. Four meetings for residential salesmen apply the basic sales principles to selling the electric range, water heater, refrigerator and home laundry. Four commercial films dramatize the selling of store lighting, office and school lighting, commercial cooking, and motor applications such as ventilating.

Two rural meetings show how to help the farmer to become a more successful business man, and illustrations of various profitable farm applications of electric appliances. While no films will be available for training industrial sales representatives, a Leader's Manual, correlating the eight basic meetings of the sales training program with the present Power Sales Manual, has been developed.

The silent trailer film, which accompanies each sound film, points up the sales situations put across by the sound story, and is intended for discussion and analysis by the student salesman. These discussion films will then enable the men to apply principles demonstrated by the slide films to their own particular sales problems.

The leader's guides supply a blue print of each meeting for the instructor to follow in directing each meeting. Each guide gives a complete outline of the meeting, in so much detail that even a comparatively inexperienced man can conduct successful and interesting meetings.

The salesmen's manual, which the trainee receives at each meeting, puts into print what he has seen and heard during the film, with additional information for home study, and then becomes the salesman's permanent reference. A self-analysis section in each manual allows the salesman to check up on his own methods.

Representatives of member companies of the Institute who are participating in the development of the program include: Davis M. DeBard, Stone & Webster, Inc.; Ford Bates, Nebraska Power Co.; R. S. Bell, The Commonwealth & Southern Corp.; Paul Brooks, Ebasco Services Inc.; John L. Burgan, New York State Electric & Gas Corp.; A. C. Crandall, Indianapolis Power & Light Co.; R. F. Hartenstein, Ohio Edison Co.; J. D. Howard, Wisconsin Power & Light Co.; H. P. Megargee, American Gas & Electric Service Corp.; J. E. North, The Cleveland Electric Illuminating Co.; J. S. Schuchert, Duquesne Light Co.; Charles Snyder, Monongahela Power Company; C. A. Stevens, Public Service Electric & Gas Co.; and R. P. Wagner, New York Power & Light Corp., who is also Chairman of the Films and Records Committee assisting Vocafilm Corporation in production.

Robert C. Hill, Director of the Appliance Division of NEWA, represented that Association in the preparation of material for the eight basic sales training meetings. The material was reviewed by the NEWA Publicity, Sales Promotion and Sales Training Committee, of which G. F. Kindley, Edgar Morris Sales Co., is Chairman. Other Committee members are: A. F. Gould, Central Electric Supply Co.; K. B. Hopkins, Graybar Electric Co., Inc.; P. D. Karsten, The Plymouth Electric Co.; L. P. Kefgen, Northern Supply Co.; S. Roskin, Roskin Distributors, Inc.; W. G. Staltz, Supplee-Biddle Co.; Adolph Ullman, Northeastern Distributors, Inc.

EEI Sales Conference to Be Held in April

The Twelfth Annual Sales Conference sponsored by Edison Electric Institute, which was cancelled last year as a result of travel restrictions, is now scheduled to be held at the Edgewater Beach Hotel, Chicago, April 2-4, 1946.

This Conference, the first general sales meeting announced since the end of hostilities, will place heavy emphasis on post-war selling conditions and opportunities. General sessions and sectional meetings on special classifications, such as Lighting, Industrial Power, Rural Electrification and Home Service, will he held.

The Conference will be open to all members of the Institute and to others interested in electrical development.

Turning on the Electrical Switches of Peace

Let's Make a Noise Like a Moose

By F. McQuillin
West Penn Power Company

A Presentation Made at the General Session of the Southeastern Electric Exchange Sales Conference, Atlanta, Dec. 6, 1945

New Conditions Surrounding the 1946 Features of Our Job

FOR something over four years Uncle Sam has been our biggest single customer—either directly or indirectly. In March of this year, Uncle Sam's expenditures, I have read, were at the rate of over ninety billion dollars a year. Eight-five per cent of these expenditures were expenditures for war. I have also read that in the first full year of civilian production, Uncle Sam's expenditures can be as low as twenty billion dollars, and that he can stop spending money for war at the rate of three billion dollars a month. Perhaps that is what is happening now. Your biggest single customer—Uncle Sam—is turning off his business switches and, consequently, his electrical switches for war, at an all-time record rate. Uncle Sam is unwinding the war economy.

"Billions" of dollars a month are rather incomprehensible to me. What I do understand is that Phil McClelland, the electrical engineer in one of Uncle Sam's plants, in a little town near my home, recently got a new job some fifteen miles away. So did a large proportion of the three thousand men and women that were working at this plant. I also understand that the electrical capacity of the plant *was* 15,000 kw—it is *now* reduced to less than a thousand, for the needs of the watchman and fire protection only. I also understand the anxiety of the owners of Loudens Department Store, Duggan's Bakery, and the Wilkins Shoe Shop in that same town about the continuation and safety of their business. I also understand the anxiety and worry of Joe Thompson, Bill Jansen, and Walter Baker—all neighbors in that town with their nice little homes and families; their anxiety is about the immediate future of their pleasant home life. This is what is happening in scores of purely war plants and the homes and stores surrounding them. This is a very real meaning to me of "billions of dollars a month"—a very real meaning to me of the statement *"Uncle Sam is unwinding the war economy."*

The United States Had a Highly Successful Sales Force

Not only was Uncle Sam our biggest single customer, but he had a huge force of employees—some twelve million men and women were in the services. Although many of them were employed in obtaining and transporting the products for war, millions of them were directly engaged in distributing the things Uncle Sam was buying—distributing these things to the customers of the Army and the Navy—the Germans and the Japs. And what a good job they did! They proved that no nation can be a world power without a highly trained distribution and sales force, no more than can any business be a success without a highly trained distribution and sales force.

We Were the Subcontractors

Every man in the electrical industry was doing *his* utmost to furnish our United States sales force both (1) the tools for distribution—the guns, the tanks, the ships, the planes—and (2) the appliances they were delivering to their customers—the bullets, the shells, the bombs.

Our civilian sales forces could only think of winning the war—theirs was a job of production. Now that Uncle Sam is unwinding the war economy, it is our turn to wind up the peace economy. Now that Uncle Sam is turning off the switches of war, it is our turn to do the selling—to "turn on the switches of peace."

Now—we have some new sales conditions surrounding this job of ours. They are not the same as in wartime. Where we had one large war-production customer like Uncle Sam, we now need the equivalent of hundreds of peace-production customers. That may mean new customers, or it may be the expansion of our present customers—or both.

Another condition arises from the fact that great scientific strides have been made in wartime. One of the results will be reflected in a sharp increase in production in peacetime. Even without that increase, a normal increase in productivity would put us six per cent above the year 1939. But the production workers can do better than that if they will—and I am sure they will! That means more sales are necessary to distribute and consume this greater production.

Many conventional methods have "gone by the board." We must think and act along new lines. For instance, we have literally hundreds of new and better uses of electricity, such as industrial refrigeration, inductive heating, dielectric heating, commercial frequency heating. And there are other new uses of electricity such as electronics, supersonics, electrostatics, atomics.

And our industrial customers have new and better products—all the way from high alloy steels, (which are mostly alloys with very little steel), to glasses that bounce, to coal that won't smoke, to hole-proof window screens, to ladies hose that won't run, and boundless others.

This means that both we in the electrical industry and our industrial customers have to create new channels for trade, as well as to re-establish all our older channels. So, at last, we salesmen have a real man's job to do—to "turn on the switches of peace!"

Our Three Main Switches of Peace—The Three "P's" of Selling—Sales Planning, Sales Production, Sales Progress

Our three main switches of peace—the three "P's" of selling—are sales planning, sales production, and sales progress.

The first main switch of peace we must close is that of planning, based on market determination. Market determination tells us (1) what industries will buy our electric service, (2) what types of application they will buy, and (3) who actually buys the product, and why and when.

Before the war we knew our markets fairly well, but how well do we know them now? I mean specific industrial markets in our own territory. In my part of the country we have long been short of personnel to keep thoroughly in touch with these markets. We have but little experience in these markets for new products and new electrical uses. Do we now know which are the most

important elements of our markets by industry?—and which are the least important? What efforts promise the best return or the worst return? Shouldn't we devise or have simple, practical methods to bring ourselves up to date and forward-looking in this first necessity for planning our work?

To be more specific, let us consider Figure 1.

In it we see a summary of prospective load additions for the industrial customers of one electric utility. It was completed right after the end of the war with Japan. It shows an estimate of the kv-a, of billing demand of known prospective load additions by different classes of industry in nine thousand square miles of territory surrounding Pittsburgh, Pennsylvania. On the left we have the class of industry, such as iron and steel, coal and coke, and glass. The first numerical column shows the load it planned and hoped to obtain for the last four months of 1945, the next column shows an estimate for 1946, the third column for 1947, and the fourth column for 1948 and later. The final column, on the right, shows the total.

In this particular electric utility area the most important industry prospect is the iron and steel business, the next most important is the coal and coke business, and the next is the glass industry. These three industries alone represent 78 per cent of the total prospective load.

On the bottom of the table are the least important industries. In this particular territory, the least important are power laundries, printing and publishing, cement, and textiles.

This condition would be very different, even in Philadelphia, at the eastern part of Pennsylvania, where oil refining and textiles are very important. I am sure it is again surprisingly different among the member companies of the Southeastern Electric Exchange. Market determination clearly shows what industries will contribute most to our future business.

From this information, you can see it would be natural for this utility (1) to intensely study these most important industries; (2) to religiously read their trade magazines; (3) to know what technical societies they should join; (4) to know what special courses they should take; (5) to know the kind of industry meetings they should attend and contribute to.

Let us look at Figure 2.

It gives the same market data, classified in a different way. This table shows the same industries as in the previous one, but they are here classified under the headings "New Industries," "Conversion," "Mechanization," "Electric Heat," and "Light." The first numerical column on the left indicates the business this electric utility expects to get from new industries. The second col-

PROSPECTIVE LOAD ADDITIONS—INDUSTRIAL CUSTOMERS, Aug. 31, 1945

KVA – BILLING DEMAND

Business Class	1945	1946	1947	1948 and Later	Total
Iron & Steel	6,642	42,484	30,149	51,567	130,842
Coal & Coke	12,576	13,753	10,992	3,955	41,276
Glass	792	4,838	8,490	12,455	26,575
Transportation	70	55	625	10,454	11,204
Chemicals & Products	2,681	4,295	42	3,162	10,180
Gas & Oil	259	2,264	831	2,742	6,096
Non Ferrous Metals	2,482	2,367	948	-	5,797
Sand Stone & Gravel	432	1,503	819	765	3,519
Clay Products	631	835	1,259	365	3,090
Paper & Products	110	300	360	2,000	2,770
Wood Products	44	1,505	505	480	2,534
Water Pumping	465	1,085	487	125	2,162
Breweries & Distilleries	140	937	582	-	1,659
Milling & Food Products	885	562	69	30	1,546
Refrigeration	177	383	38	80	678
Rubber	319	230	50	-	599
Leather & Products	-	-	-	495	495
Textiles	40	85	115	-	240
Cement & Products	-	10	140	3	153
Printing & Publishing	57	-	68	13	138
Power Laundries & Dyeing	7	10	13	30	60
Other	733	394	361	910	2,398
Total	29,542	77,895	56,943	89,631	254,011
Value at $25/KVA					$6,350,275

Fig. 1—Prospective industrial load additions, over a four-year period, are summarized according to class of business.

KVA – BILLING DEMAND

Business Class	New Industries	Conversion	Mechanization & Expansion	Heat	Light	Total
Iron & Steel	1,642	48,355	27,863	51,594	1,388	130,842
Coal & Coke	938	9,820	28,827	630	1,061	41,276
Glass	-	1,460	8,021	16,767	327	26,575
Transportation	5	10,375	664	75	85	11,204
Chemical & Products	-	3,245	1,419	5,492	24	10,180
Gas & Oil	20	4,280	1,759	10	27	6,096
Non Ferrous Metals	-	1,000	3,035	1,678	84	5,797
Sand Stone & Gravel	1,185	990	962	375	7	3,519
Clay Products	-	1,385	720	796	189	3,090
Paper & Products	-	2,300	460	-	10	2,770
Wood Products	1,205	1,165	110	48	6	2,534
Water Pumping	144	1,790	206	-	22	2,162
Breweries & Distilleries	-	1,080	475	100	4	1,659
Milling & Food Products	206	359	801	174	6	1,546
Refrigeration	-	295	355	12	16	678
Rubber	8	-	500	91	-	599
Leather & Products	-	495	-	-	-	495
Textiles	-	60	50	40	90	240
Cement & Products	-	13	140	-	-	153
Printing & Publishing	-	-	-	114	24	138
Power Laundries & Dyeing	-	42	10	-	8	60
Others	138	1,400	539	261	60	2,398
Total	5,491	89,909	76,016	78,257	3,438	254,011
Value at $25/KVA						$6,350,275

Fig. 2—Here the load additions in Fig. 1 are classified according to application

Fig. 3—None of you thought of this application for electric heat!

"Do you mind if we girls pop some corn in the infra-red tunnel?"

umn, from the conversion of other forms of energy to that of electric service. The third column, from mechanization and expansion. The fourth column, from electric heat. And the fifth column, from lighting.

Look at the fourth column. The largest single prospect in this tabulation is for electric heat in the iron and steel industry. Further breakdown of this figure would show the importance of melting, annealing, heating for forging—and on down the line to drying by electrostatics and infra-red.

Of course, there are many potential applications that are not included in this tabulation. Everyone has new ideas these days. For example, I am sure none of you thought of the new application indicated in Fig. 3.

Yes, there are lots of new ideas, but coming back to our market table—Fig. 2.

Look at the second column. The second largest prospect is for conversion of other forms of energy produced in the iron and steel industry. Further breakdown of this figure would show that the problem is one of big boilers, turbines, and fair quantities of waste heat—only a very few internal explosion engines.

In the third column, under the title of "Mechanization and Expansion," there are two large markets—one in the coal and coke industry, and the other in the iron and steel business.

Look at the total for the next to the last column on the right—for lighting. This total may be surprising to some of you, because of its relative unimportance compared with the other classes of problems. The major reason for its unimportance lies in the fact that this particular market area is one of coal mining and "tonnage production." There are a few minor fabricating plants, and in such plants the proportion of lighting to the total is very much larger than is indicated by these totals.

As each of these items was analyzed in greater detail, here were some of the conclusions that arose from this market data:

1. Because of the great importance of electric heat in this area, specialists on electric heat and its application must be available for the service of all of the power engineers and salesmen.

2. Because of the specific large power station conversion problem, they must have mechanical engineers, highly trained for this particular phase of their business.

3. Because the mechanization and expansion in two of their industry classifications is very important to them, they must be skilled in production planning and work simplification within their customers' plants as one important means of getting this business—as well as expert knowledge of modern coal production methods.

4. As for their lighting problem, it is clear that here they should try to arrive at the lowest possible cost method of promoting it. A group of about 100 men from customers' plants, who are vitally interested in this tool of production, are organized to attend all-day meetings several times a year at the very wonderful Lighting Institute in Cleveland conduct-

Fig. 4—Like the shoemaker's children without any shoes

"A fine lighting engineer you are! Go give your daughter a sales talk on better illumination!"

PROSPECTIVE LOAD ADDITIONS—INDUSTRIAL CUSTOMERS, AUG. 31, 1945

KVA - BILLING DEMAND

Application	1945	1946	1947	1948	Future	Total
New Industry	786	3,240	960	475	30	5,491
Conversion	5,957	17,907	24,790	3,232	38,023	89,909
Mechanization & Expansion	15,566	42,212	15,569	2,730	839	76,916
Heat	6,118	13,142	15,207	6,480	37,310	78,257
Light	1,115	1,394	417	40	472	3,438
Total	29,542	77,895	56,943	12,957	76,674	254,011
Value at $25/KVA						$6,350,275

Fig. 5—This table brings in the element of timing—when do we get this business?

ed by the General Electric Company. These men, by becoming lighting experts themselves in their own plants, are the utility's best lighting promoters. Of course, when they get home at night they might be like the shoemaker's children —without any shoes—as the next picture (Fig. 4) shows.

But let's go back to work and look at Fig. 5.

This table completes the market picture I have brought along for this Western Pennsylvania utility. It brings in the element of timing—when do we get this business? It again shows the same basic market data, summarized in a third way. And it indicates whether certain of these activities are pressing and immediate, such as the mechanization and expansion market, where we see very large totals under the years 1945, 1946, and 1947; or whether the activities require steady, long-term engineering and promotion, as is indicated by the totals after "Conversion" and "Heat," where substantial figures carry on into the future.

Another use is made of these market studies which perhaps is not so obvious. Other groups of engineers use them continuously—first, as a basis for checking and development of (1) generating capacities required; (2) as a basis for system planning. The estimated load additions are located on a map by comparatively small areas. Diversities are allowed and added to the existing loads in these same small areas. From these determinations, high tension lines and prospective substations are tentatively located. They are also used on (3) distribution estimates. The engineers in all three branches, generating, system planning, and distribution, also use these estimates for budgeting purposes.

The detailed basic data, including customer's name, plant location, and the specific power-using application, are listed and forwarded to all of this utility's District and Division Managers, so the entire Operating Department is informed of the specific promotional activities in each customer's plant located in his operating area. You can imagine the cooperation that is possible when everyone knows the common objective!

With this market information before the sales engineers of the group, it becomes quite possible to develop definite educational programs. To develop case-conference reviews of applications that come under these headings. To invite manufacturers of specific products to speak before the group on their products. To encourage cooperation with manufacturers by indicating the size of the markets which are most interesting to them.

This market knowledge stops wasteful "chasing up blind alleys" and eliminates confusion by focussing sales efforts where they can show profitable returns quickly. Sharper market determination is, then, the first "switch of peace" we should close.

* * *

Now that that first switch is closed, let's proceed to close the second "switch of peace." The second "P" in selling is sales production. The first switch enabled us to see what kind of personnel was necessary to do the job, what were the specific training requirements that should be planned; the second switch will deal with "Getting the Customers' Orders."

One of the new things in selecting personnel involves pretesting of personnel or aptitude testing. This was done in the Army, and some groups of Army men paid great attention to it. It speeded up our Air Force remarkably. Perhaps we should study and use these new methods.

At a recent meeting of some 20 members of the Sales Executives' Club of Pittsburgh, all of them, except the public utility, were using some form of aptitude testing for determination of the kind of people that would be happy and successful in their jobs.

My own boy, returning from the Army, has just had the experience of going to more than 12 different groups of people in the steel business in search of an opportunity to earn his living. Of the 12 groups, more than one-half gave him aptitude and psychological tests. These tests varied from a verbal interview with a doctor (a psychologist), lasting over an hour, to the simplest form of mechanical aptitude test. If his first month's experience in the opportunity he took is anything to go by, both he and his company are going to succeed.

Are we familiar with the benefits or otherwise of this method of attempting to get the best people—the people who will be happiest at the job we have to do? The people that will help us to "turn on the switches of peace."

The highly successful sales force of the Army had to learn very rapidly. New methods were developed which were just as easy to take as is a shot of good Scotch—to some people. One of those methods was the extensive use of moving pictures. Some six months ago I attended a meeting of the American Society of Mechanical Engineers and in the space of 40 minutes I understood more, from a moving picture, about analytical geometry than I ever understood in the years of pounding at it in college. The General Electric Company, the Westinghouse Company, and many other manufacturers in our electrical industry are now using these methods. They make learning both *easy and rapid*.

When it comes to making the sale—"bringing home the bacon"—there are some both old and new methods that are very effective. Mr. Borden, of the famous team of professors of Borden and Busse of Columbia University, told this story about contacting our prospects. Under the title of "How To Make A Theme Song Help You Sell," Borden says, "Have you ever heard a moose call? Listen! Bla-a-a-a! No doubt you will agree there are many sounds more pleasing to your ear than a moose call. More pleasing to your ear, for instance, is the sound of sleigh bells (jingle the bells).

More pleasing to your ear, perhaps, is the sound of a bugle—ta-ta-ta! But, when you go out in the woods to bag a moose, you are not guided by what you like—you are guided by what the moose likes. So, knowing that the sweetest sound to the ears of a moose is the mating call of a lady moose, that's the noise you make—Bla-a-a-a! Your motto is—make a noise like a moose!"

Let us try to illustrate some methods of presenting propositions, new methods of satisfying complaints, new methods of getting the customer's order, new methods of delivering service like a battleship launching, new methods of earning new inquiries from your customers by "making a noise like a moose."

I've always thought that of all the dry, difficult-to-read, time-taking, and even annoying things I must read, the worst is an engineering report as it used to be made. Perhaps our customers feel the same way about it. I wonder whether we can't try something new in place of this engineer's routine. I don't mean that it's new to the customer-public—it's just new to the way engineers generally make a report. The psychologists say you retain 10 impressions through the eye for each impression you retain through the ear. . . . Wouldn't it be swell, in presenting our propositions, if we could both "make a noise like a moose" and tell it to our prospects both across-the-table and in pictures instead of 50 or 60 page reports?

Figures 6 to 14 try to show what I mean. The president of the company, Fig. 6, lived 50 or 60 miles away from the plant and did not get to the plant more than once every four or five months. He was not at all familiar with the details of the plant—he was not a bit interested in pounds of coal per kilowatt-hour, efficiencies, power factor, kilowatts, kv-a., or any of the other jargon of our trade. So, here's the report that was made to him in nine simple pictures. Fig. 6 shows how the sales engineer was guided by what the customer liked—savings! That was his "moose call."

Fig. 6—The sales engineer's "moose call" says "Savings!"

Fig. 7 showed where the power engineer got his figures—by using actual names of the people who gave him the figures.

Fig. 8 dramatizes what 814,000 cu ft of gas means.

And now on the next page—

Fig. 9 just doesn't say "labor"—it says, "Yea, and it takes two men to nurse it along, one on each shift."

Fig. 10—"And enough oil to run a battleship—two barrels a month!"—a slight exaggeration I'd say, but you can do it in pictures.

Fig. 11 shows the manager tearing his hair because the engine won't start in the morning and there are six men loafing.

Fig. 12 shows the power engineer reporting to the manager, supported by the foreman.

Fig. 13 illustrates comparative costs without getting into a battle about details.

Fig. 14 illustrates the blessings the power man received from the general manager and the foreman.

This picture story was presented to the President in his office 60 miles away

Fig. 7—Where the Power Engineer got his figures

Fig. 8—What 814,000 cubic feet of gas means

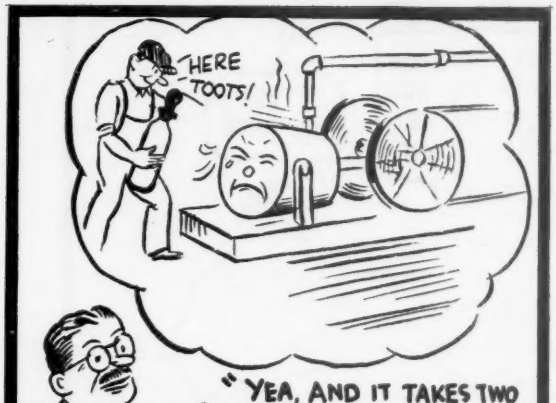


Fig. 9—The "What" and "How" of labor cost

Fig. 10—A slight exaggeration—but the point is there

GEE, WERE LATE STARTING. GUESS THE ENGINE IS BALKY AGAIN!
WHAT DO YOU CARE? YOU'RE GETTIN PAID AINT YA?
"THEN WE GOT TO FIGURE PRODUCTION TIME LOST WHEN THE ENGINE WONT START- SIX MEN LOAFING!"

Fig. 11—Production stoppage—men loafing—costs rise!

Fig. 12—The power engineer makes his report to the manager—heavy support from the foreman!

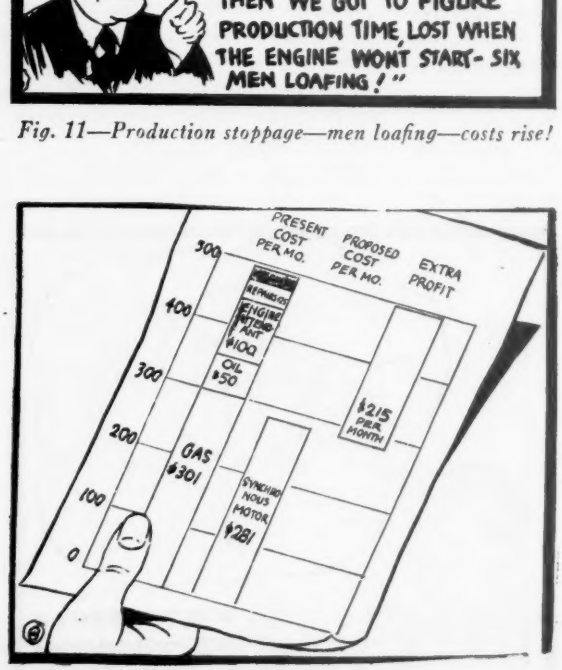


Fig. 13—Comparative costs—simple as the ABC's

LOOKS O.K. TO ME FRED!
YEA, THOSE MOTORS WILL SAVE A LOT OF MY TIME TOO!
THEN I CAN TELL MR SLICK HE CAN SAVE $215 A MONTH BY BUYING TWO MOTORS?

Fig. 14—A customer sold on "Savings"—Blessings on you, power man!

and, what is more to the point, they bought the motors, they threw out the engine, and they've been good customers of that power company ever since. The Army learned some new ways of presenting facts. Perhaps, like this example, our business will present facts in new ways—will make reports live—and be acted upon promptly. *Let's make a noise like a moose!*

Of all the time-taking and even annoying cases to many power men and power companies, perhaps one of the most difficult is the continually dissatisfied customer. You all have one of them, and I wish you'd think about that one while I suggest a new method of satisfying that one.

Have you thought of one? One, mind you. Not dissatisfied customers in general, but one specific dissatisfied customer. Dissatisfied with his bills. Are you thinking of him? Then nail that one dissatisfied customer firmly in your mind so that it will stay for the next three minutes.

Here's a picture, Fig. 15, which was made up to show, we'll say, your particular disgruntled customer and what he gets for his power-dollar. Sorry it doesn't show up better, but actually this picture consists of pictures of his plant, advertising his plant. These are things he likes—that he's proud of. *This is his "moose call."* In the middle, a dollar has been divided up into pieces to show how much of each power-dollar goes into his different operations. This man was going to throw out his oil bath electric heating process—one of the smallest sections of his power dollar—four cents worth, to be exact. This picture satisfied him on that score. But, far better than that, he was so proud of his plant that he had the original framed and put back of his desk—everyone that came in was shown his plant. And, believe it or not, because the *"moose call"* was presented in a graphic manner, he *"lived happily ever after."*

Another new method, but in reality, very, very old, is coming more and more to the fore. I like to call this method "let George do it!".

If you were asked what was the biggest single thing, the most helpful thing, that started your customer's interest in good lighting for his plant, I'm sure you would all give one answer—it is the small, handy sight-meter. You walk into the plant and, if the fellow you're with at the moment happens to be George, a lodge brother of yours, you talked a little about his lighting, you pulled out the sight-meter, and immediately the lodge brother said, "How does that thing work anyhow?" And, if you're good, as I'm sure you all are, you put it into his hand and said, as he tinkered with the multiplier, "I'll be glad to demonstrate it, George. Now take this over to the bench where that man is working, take off the cover and there you can see how little light that man has." He reads the red section and it says, "Inadequate for critical seeing." That worries him a little, so he takes it over to the window and tries again. Then he says, "Why,

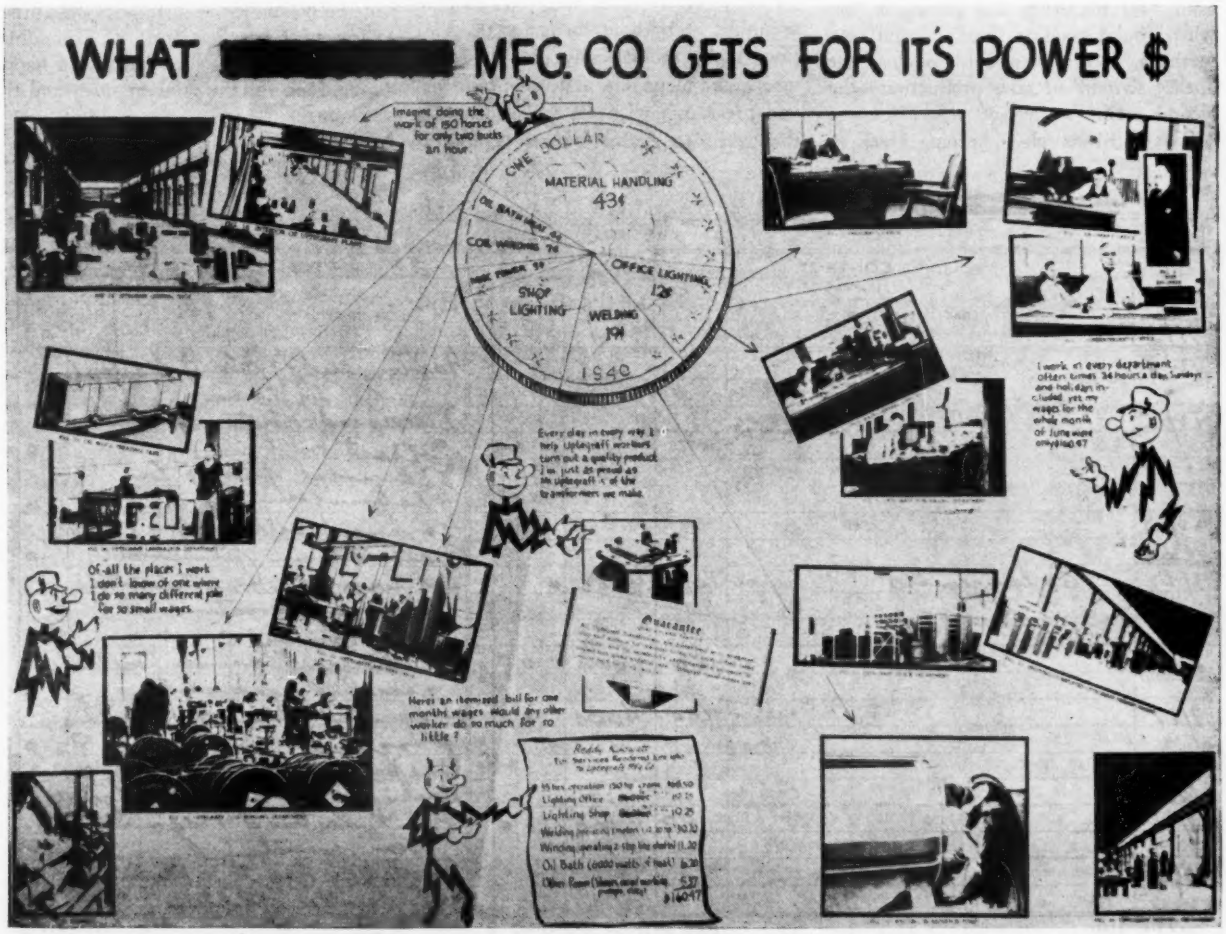

WHAT [redacted] MFG. CO. GETS FOR IT'S POWER $
ONE DOLLAR
MATERIAL HANDLING 43¢
OFFICE LIGHTING 12¢
WELDING 10¢
SHOP LIGHTING
1940
Of all the places I work I don't know of one where I do so many different jobs for so small wages.
Here's an itemized bill for one month's wages. Would any other worker do so much for so little?

Fig. 15—Here's how a customer is shown how much of the power dollar is spent for each industrial operation

there's no trick at all to this thing, is there?" And that's the way you crack demonstrators start a demonstration sale. You didn't demonstrate it yourself—instead, you "let George do it." Now we're doing that with electronic heating equipment, with infra-red drying equipment, with the spot, dip, and strip heaters, with "clamp on" ammeters, but don't forget—the real secret is "let George do it."

When it comes to getting the order, time and time again we forget how to close it. When the prospective customer, with some kind of an internal explosion engine, is interested enough to say, "When the hell can I get a motor?", do you "muff" that one and mumble that you'll try to get him one, or do you close the order by asking him, "When do you want it?" And, similarly, "Where would you like your electric service?" "Which voltage do you think you prefer?" And, "What size will meet your needs?" We power engineers sometimes forget those most efficient ways of asking for the order and getting it. So, when you're good at these old and new methods, you're than able to close the "peace switch" of sales production—the second main "switch of peace."

The third switch is keeping track of progress. One of the reasons I've always enjoyed selling is because if I made records, I could always satisfy myself how I was doing. It is very difficult for a vice-president to check on his daily performance, but we can satisfy ourselves every day. Of course, to do it properly, we have to make some kind of a record.

In the prewar days, some of the records we were called upon to make were a tremendous burden to us. I remember a wonderful system whereby every contact made was completely reported. Five copies were sent to all interested parties and probably not one-tenth of them were read. It was a wonderful system—it took nearly half of the time of the men who were reporting! To say nothing of the time of stenographers and file clerks! Why—it took more than half of the time of the boss that designed the system to try to keep up to the reports. I was the man who designed the system!

During the war many simple methods of reporting progress have been evolved. These simple methods are so easy and so useful to each sales engineer that he wouldn't be without them and, in addition, they automatically provide supervisors, and managers, and vice-presidents, and presidents with all the information they need to evaluate their results, to change their emphasis, or to redirect the effective efforts of all of us.

Fig. 16 shows a simple card which the sales engineer would not do without. On the left you'll see the dates the contacts were made. Next, you can see what the contacts were about. And, next, the size of the load involved and the probable amount of revenue and four little columns—one says, "Started"; the next, "Continued"; the next, "Ordered"; and the next "Dropped." In this case, the customer was both rebuilding and making an enlargement of his plant, involving 100 kv-a demand and $4,000 a year, in March, 1944. Six months later the card shows the order was received and service was connected. On the right are covered various short items concerning services performed by the power engineer, and it shows whether or not the problem was "unfinished"—whether it was "satisfied." The last column provides for lost business. In this particular case, the customer had a fire which had entirely destroyed his plant and, at that time, he was very much interested in the possibility of installing some other form of power, as well as expanding. As you see, it resolved itself to a happy conclusion for the sales engineer and the customer.

Looking at this card a little more

CUSTOMER [redacted] DISTRICT E1 Card #2

SERVICE LOCATION SALES ENGINEER G.E.D. See Card #3

CONTACT DATE 1943	SELLING CONTACT: NEW LOAD DESCRIPTION	KVA	EAR	STARTED	CONTINUED	ORDERED	DROPPED	RESELLING CONTACT: DESCRIPTION	KVA	EAR	UNFINISHED	SATISFIED	LOST
12/8								Factory and "J" plant destroyed by fire			•		
12/15								Discussed contract and effect on billing				•	
								Discussed plans for rebuilding				•	
12/29								Arranged billing for shutdown period				•	
1944 3/27	Enlargement	100	4000	•				Discussed new construction service relocation + wiring			•		'
5/19	"	100	4000		•			Re discussed service location + reached agreement				•	
7/17	"	100	4000		•			Inspected wiring + rebuilding Progress				•	
7/25								Unexpected service entrance				•	
8/22/44								Service problem at "Lodge"			•		
9/6	"	100	4000			•		Plant restored + again in operation				•	
10/5								Reported to Security on domestic service problem				•	

FORM 3495—444441 RECORD OF CONTACTS WEST PENN POWER CO

Fig. 16—Basic data for market analysis is kept up to date on this card

FORM 3237- REV. 1. 701477 INDUSTRIAL SALES DEPT. WEST PENN POWER CO.

CUSTOMER PERSONNEL	TITLE	ADDRESS	Mail List Nov'c	L	A	P	E	T
[redacted]								
[redacted]	Ch. of Board	[redacted]						
[redacted]	President	" "						
[redacted]	Vice Pres.	[redacted]					●	
[redacted]	Ch. Chemist	[redacted]						
[redacted]								
[redacted]								
[redacted]	Vice Pres.	[redacted]		●		●		
[redacted]	Pl. Engr.	" "		●		●		
[redacted]	Chemist	" "						
[redacted]	Mast. Mech.	" "		●				
[redacted]	Pr. House Supt.	" "						
[redacted]	Ch. Electrician	" "						

CUSTOMER

[redacted] - Main Plant GED

Fig. 17—Complete, accurate advertising and sales promotion mailing lists are maintained with cards such as this

carefully, you will see that both the sales engineer and management can get a lot of information from a simple report. When a dot appears under the heading "started," this particular load goes into the market record. I have already discussed what can be done with complete market determination. The final dot under "Ordered" takes it out of the market and puts it into the record for sales for that month. Obviously, many other analyses are possible, such as when was this customer last seen? Are we seeing him often enough? How much of our time are we spending on service? How much on direct sales promotion? These are things that the individual sales engineer likes to know and so does management. Here is a simple way to get them all!

Individual records can easily be made for the use and information of each sales engineer.

Fig. 17 is another simple card that goes with the one in Fig. 16. It lists the customer personnel, their titles and addresses. It shows the men in the plant who buy or who have a direct interest in buying. In addition, it shows, on the right, what advertising pieces or periodicals (such as *Electrified Industry*) are being sent, and to whom they are being sent. It permits complete up-to-date advertising lists to be maintained. Again, it is most useful to the sales engineer and to the management. Both this personnel card and the contact card are in little, handy, desk-top Kardex books.

These are typical of simple records that record progress and close the third main switch of peace.

These methods of market determination, of sales production, and of recording sales progress have naturally increased the efficiency of selling and reduced the unit cost of sales—and that is the "moose call" to management of public utilities.

To you sales engineers, sales supervisors, sales managers, sales executives this is basically old stuff. As I was talking to you, you must have had the same feeling as the Hollywood newlywed on the occasion of her fifth or sixth wedding. When she entered her new home, something seemed to be very familiar to her. She said, "Jack, darling, are you sure we haven't been married before?" Like this very modern Hollywood girl, perhaps it's old stuff, but its urgency is new and its methods are new.

There's been a lot said recently about "the brave new world." When these three main switches are closed, I'm wondering whether we're not in "the brave new world." We're not selling the same old electricity. We are an ultra-modern industry—with an ultra-modern product—electricity. We still make and deliver our service at the speed of light—just one step short of the speed of the alpha-rays—the atomic age. Can't we have new things in our sales program? Can't we get much quicker use of the new equipment to use our electric service? Can't we absorb the new methods of training quickly and eagerly both the old experienced men and the young men in our industry? Can't we develop new, attractive and spectacular advertising? Can't we develop new, attractive, likeable and spectacular service personnel? And, above all, can't we have a new confident attitude towards our customers and our jobs?

Business, at last, is again nearly "on its own." We have to prove ourselves. Let's go "nuts" about doing everything electrically—then our friends and our neighbors will join with us. Let's excite our customers to buy—and buy—and buy. Let's turn on these electrical "switches of peace"!

I hope I Made a Noise Like a Moose

Customers' Billing in an Electric Utility

By John D. Elliott

Assistant Supervisor, Customers' Accounts Department, The Detroit Edison Company, Detroit, Mich.

Reprinted courtesy *N.A.C.A. Bulletin*

UTILITIES are continually endeavoring to find a more efficient and simplified method of billing their accounts. The cost of billing is a sizable operating expense due to the volume of bills that must be prepared and the relatively small amount of each bill rendered on the majority of residential accounts. In general, the utilities are taking advantage of the volume of accounts in establishing mass-production methods which have greatly minimized the cost and inaccuracies of old longhand methods.

Special Billing Problems

The cost of billing an account in an electric utility is increased by the periodic reading of meters located on the customer's premises, but by reading as many meters in one neighborhood on the same day as possible, the cost of meter reading is kept at a minimum. The billing in this type utility appears simplified as compared with other businesses due to having the same customer for a relatively long period of time, his service requirements seldom changing, and being able to bill a single commodity and large groups of bills frequently being the same amount. However, there are also many requirements not common to all businesses, such as (1) maintaining the meter reading at the previous billing period so as to have it available when the next meter reading is secured to determine the amount of use the customer has made of the service, (2) billing an account when it is impossible to gain access to the meter on the customer's premises, (3) the special handling required in setting up and closing accounts and preparing final bills, and (4) the necessity of close scheduling of billing.

The bill for a customer whose meter is scheduled for reading on a certain day must be prepared and regularly delivered to him a specified number of days in advance of the scheduled due date. It is impractical, if not impossible, to bill all accounts at the month end. The work must be distributed evenly throughout the month. A portion of the meters must be read each day, a portion of the accounts billed each day, a portion of the bills mailed or distributed each day, and a portion of the bills must become due each day or every few days, to create an even flow of all types of work. When meter readers are unable to secure a meter reading, the reading is usually estimated, providing the preceding reading was not also estimated, in which case it is necessary to make further efforts to secure an actual reading.

The Detroit Edison Company has recently completed the installation of a new streamlined billing system, adopting some mass-production features by using tabulating cards which flow through a series of machines, gradually accumulating information and producing the bills, like material flowing down a production line in a factory gradually becoming the finished product. Many mechanical features have been introduced, reducing clerical errors and speeding up the billing operation. Our method of billing is 100 per cent mechanical from the time the meter reader marks the meter reading on a card until the bill is ready for mailing, except for certain visual checking operations to assure neatness and absolute accuracy. It was necessary for this company to do a considerable amount of pioneering in developing its present system which embraces several new features that have not yet been adopted in the utility field. We now have a modern system and plan to keep it that way by taking advantage of all new developments as they arise.

Size of Job

The Detroit Edison Company has 835,000 customers in an area of 7587 square miles in Southeastern Michigan serving 345 cities, villages, and townships, including the City of Detroit. The majority of these customers are furnished electric service although gas, water and steam heating service is provided a small number of customers in certain communities. We normally bill approximately 22,000 bills each working day.

During World War I, as an economy measure and due to the scarcity of help, the Detroit Edison Company decided on a plan of bimonthly meter reading and billing for all residence accounts. This was received so well by its customers, and proved so advantageous to the company, that is was never discontinued. Bimonthly billing has not generally been accepted in the utility field, but due to the manpower, gasoline, and transportation shortages during World War II, some companies adopted the practice of multimonthly meter reading and billing. Still others chose to conserve in meter reading only by estimating intervening bills, so that customers would continue to receive a bill every month. Many utilities, realizing the savings to be made in multimonthly meter reading and billing, will undoubtedly continue the practice as this company did after World War I.

Basic Records

The following brief outline of the punched-card method of billing in this company brings out the mechanical features without mentioning the details in relation to them. The customer's ledger record and bill are the size of a tabulating card and are made up from two other forms of tabulating cards maintained for each customer. All these tabulating cards are 7⅜ by 3¼ inches, into which holes are punched similar to those in a player piano roll. These cards are fed through machines which sense the data punched therein by making electrical contacts through these holes, thereby actuating the various machines to sort, add, subtract, multiply, divide, print, interpret, merge, match, separate, reproduce the holes from one card to another, or a combination of any of these operations. The two cards that print the bills are (1) a "name and address card" (Exhibit 1) which is a punched card used in addressing the customer's bill and office records, and (2) a "ledger record card" (Exhibit 2) which contains the customer's billing information and from which the billing data are printed on the bill. This latter card is also used after billing as a source of billing information in answering inquiries and is the record to which the customer's payments are

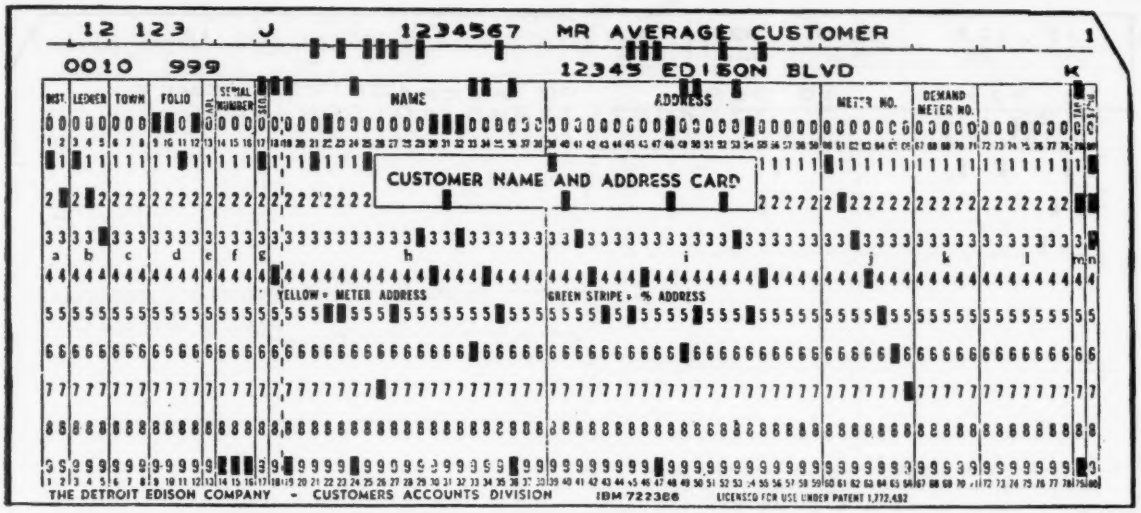

12 123 J 1234567 MR AVERAGE CUSTOMER 1
0010 999 12345 EDISON BLVD K
DIST. LEDGER TOWN FOLIO SERIAL NUMBER SEQ. NAME ADDRESS METER NO. DEMAND METER NO. DAY CYCLE
CUSTOMER NAME AND ADDRESS CARD
YELLOW = METER ADDRESS GREEN STRIPE = % ADDRESS
THE DETROIT EDISON COMPANY - CUSTOMERS ACCOUNTS DIVISION IBM 722386 LICENSED FOR USE UNDER PATENT 1,772,432

Exhibit 1—Name and Address Card

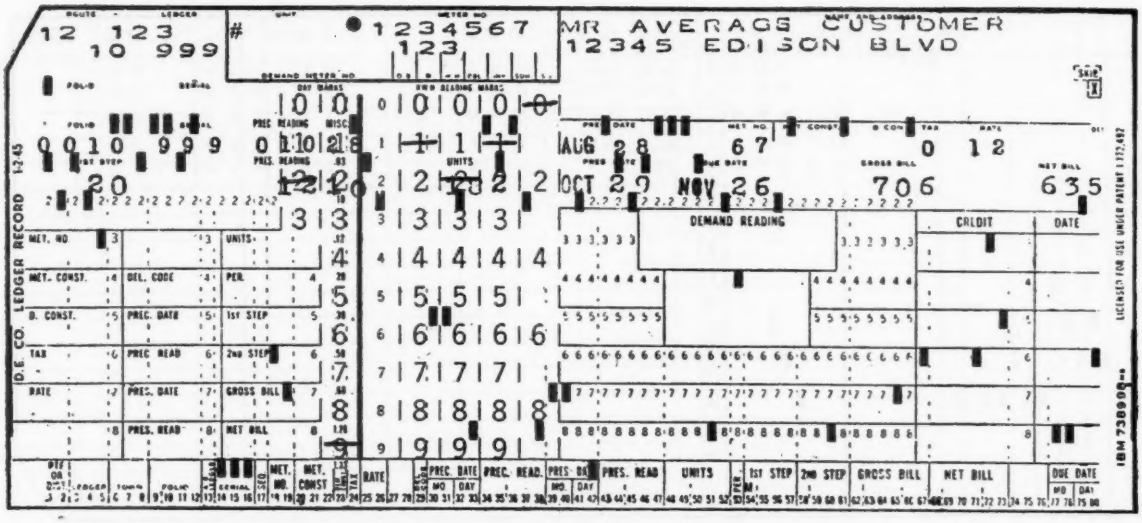

12 123 10 999
1234567 123
MR AVERAGE CUSTOMER 12345 EDISON BLVD
0010 999
AUG 28 67 0 12
OCT 29 NOV 26 706 635
DEMAND READING CREDIT DATE
D.E. CO. LEDGER RECORD 12-45
MET. NO. UNITS MET. CONST. DEL. CODE PER. D. CONST. PREC. DATE 1ST STEP TAX PREC. READ 2nd STEP RATE PRES. DATE GROSS BILL PRES. READ NET BILL
RATE PRES. DATE PRES. READ UNITS 1ST STEP 2nd STEP GROSS BILL NET BILL DUE DATE
LICENSED FOR USE UNDER PATENT 1,772,432
IBM 738000

Exhibit 2—Ledger Record Card

posted. These two cards each contain common information pertaining to the customer's account such as the number of the control unit in which the account is maintained, the account number therein, rate, tax status, etc.

The name and address and a "meter reading record card" (Exhibits 3 and 4), not heretofore mentioned but used to provide a continuous record of the customer's meter readings, are permanent records. A new ledger record card is reproduced after each billing of an account and contains available information to be used for the next billing of that account. This card, being prepared in advance for the next billing, is commonly called the "Advance Card."

Recording Meter Readings

The advance cards (Exhibit 2) and the meter reading record cards are interfiled with one another by account number and are so filed from one billing period to the next. At the time the meters for one day's work are to be read, the advance cards are mechanically separated from the meter reading record cards and are carried to the customer's premises by the meter readers. The advance cards now become ledger record cards. Using a pencil with a high graphite content, the meter reader makes marks (or draws lines) in boxes printed on the face of these cards to designate the meter readings. The marked cards are returned to the office where these marks are electrically sensed and converted into punched holes in the same cards along with the date of the reading. This is called "mark sensing" and is the first mechanical step of the billing procedure. The pencil marks are sensed by pairs of brushes passing over each mark through which an electric circuit is completed. These cards now contain the preceding and present readings of the customer's meter. (The preceding reading was set up in the card when it was prepared after the preceding billing.)

A day's work is divided into three batches of approximately 7000 accounts each for the subsequent operations. The cards then pass through another machine which subtracts the preceding reading on

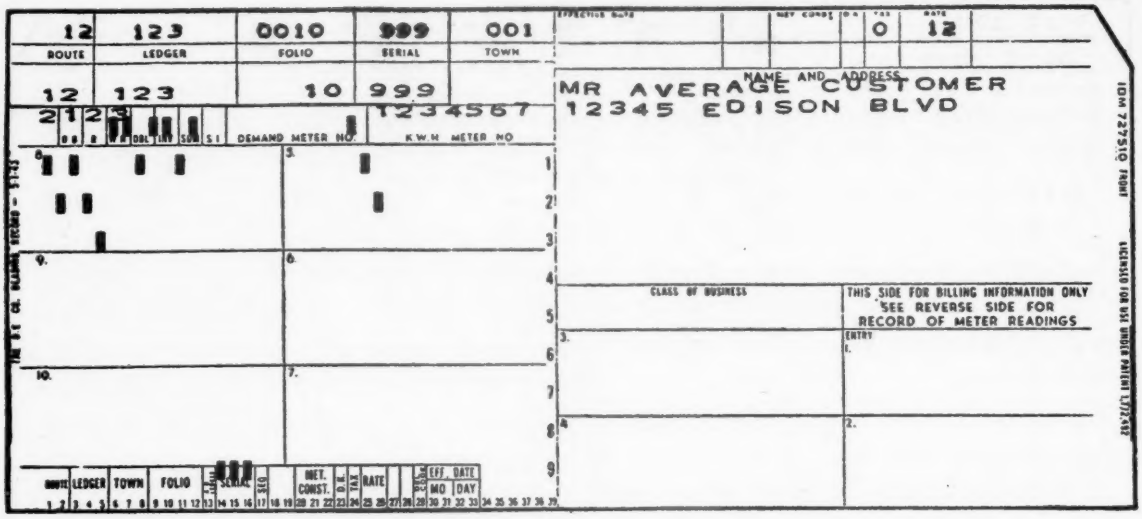


Exhibit 3—Meter Reading Record Card—Address Side

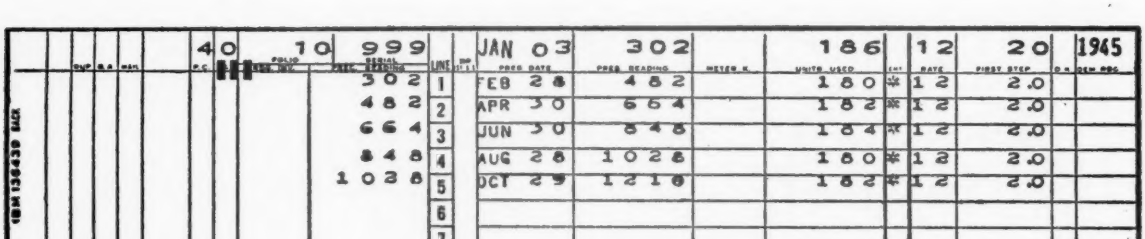


Exhibit 4—Meter Reading Record Card—Billing Information Side

each card from the present reading, automatically punching the difference into the card. The difference is the total number of units used by the customer since the last billing. The meter reading record cards, from which the then advance cards were separated before meter reading, are mechanically matched with what are now the ledger record cards, and the meter readings are mechanically posted to the meter reading record cards (Exhibits 3 and 4) from the ledger record cards, thereby adding to the historical information already posted to the meter reading record cards after previous readings. The meter reading record cards are visually examined at this point. The units used for each account are compared with those of previous billings for that account to detect any unusual fluctuations in use which are investigated before the bill is prepared. The meter reading record cards are then returned to the file where they are used in answering customer inquiries.

Sorting and Rating

The ledger record cards are sorted according to the number of units used so that all cards for customers who consumed the same number of units since the last billing are brought together. A master rate card is mechanically inserted in front of each group of cards containing the same number of units used. The correct amounts of the gross and net bill are mechanically reproduced from the master rate card into the following ledger record cards for the same number of units used. The ledger record cards are then mechanically listed on the proof tapes showing all the billing information in the cards, and a manual check to assure accuracy further is applied. The ledger record cards are then mechanically sorted to ledger and account number order, and a billing register is listed for reference purposes.

"Summary" tabulating cards are automatically produced as the billing register is listed showing the totals of: number of accounts, units used, and billing amounts according to rate and tax ex-

(*Continued on page* 366)

Scientists Explore Possibilities of Atomic Power for Electrical Production

Competitive Aspects of Atomic Energy with Other Power Sources Is Analyzed

EDITOR'S NOTE: The possibilities of atomic energy as a power source for peacetime industrial production were discussed by authoritative speakers at a symposium presented at the National Association of Manufacturers Annual Convention, New York, N. Y., on Dec. 6, 1945.

Participants were Dr. James B. Conant, President, Harvard University, Moderator; Dr. S. K. Allison, Director, Nuclear Studies, University of Chicago; Dr. George T. Felbeck, Vice President, Carbide and Carbon Chemicals Corp.; Dr. Crawford H. Greenewalt, E. I. du Pont de Nemours & Co., Inc.; Major General L. R. Groves, Director, Manhattan Project; P. C. Keith, President, Hydrocarbon Research, Inc.; William L. Laurence, New York *Times;* Dr. J. A. Wheeler, Professor of Physics, Princeton University; Dr. Charles A. Thomas, Vice President, Monsanto Chemical Company; James C. White, Tennessee Eastman Corp. Pertinent excerpts from the symposium follow:

CHAIRMAN CONANT: . . . the development of the atomic bomb was an extraordinary achievement. It was an achievement it seems to me of a giant team composed of members of the Army, physicists, theoretical and experimental chemists from our universities, and engineers, and industrial scientists drawn from many of our leading industries. No one can say who played the leading role in this exciting drama, but I think the American people do not as yet appreciate fully the extent to which both engineers and scientists, chemists, and physicists, and construction and production men from the industry were involved, nor do they realize what an unusual job of construction and production had to be done in order to complete the project in the shortest possible time.

A roll call of all the industries who contributed to the project would include, I imagine, practically all or nearly all the major companies, and many of the smaller ones in the United States . . .

Now, I judge from our experience on listening to the radio and seeing the movies, it is appropriate for me to say this program is completely unrehearsed. We have been at it only since eight-thirty this morning, until time for lunch, and the one thing on which all these gentlemen were agreed, and it is not an easy thing to get a group like this to agree, I want you to know—the one thing on which they were agreed was that the question which is there on the board: Will atomic energy revolutionize our civilization?—that question is a very bad one. The word "revolution" they felt was either too definite or claimed too much. I asked them if they wouldn't agree on that, what question would they agree on, and they couldn't agree on the question.

Peacetime Uses Seen

But, lest you now think that this is going to be a fruitless discussion, let me anticipate a little bit by saying they did agree on one important matter and that was, it was their unanimous opinion that there will be significant uses of atomic energy for peacetime purposes at some date in the future.

So, our problem really is to explore that statement in more detail, and I am going to do this by calling on the members of the panel to answer certain specific questions and then ask them to break in on each other and have the discussion continue as best we can. . . .

Now, as a basis for our discussion about atomic energy for peacetime uses, I should first of all like to ask Professor Wheeler, who is the expert on nuclear physics with us here today, this question: What are the basic facts or some of the basic facts which control the size and weight of any possible future power unit?

I am going to ask him to answer this question at some length, as it will form the basis for an understanding of what follows.

Basic Factors of Power Units

PROFESSOR WHEELER: Dr. Conant, it seems to me that the logical starting point for our discussion is this: The greatest fact about the whole development now is that it works. We actually have a way not only to convert nuclear energy into explosive force through bombs, but also in the plant in the State of Washington, a working procedure by which we now convert nuclear energy into heat.

It is true that we still have to solve two big problems before we convert nuclear energy into worthwhile purposes. We have to take that heat which we produce now and manufacture heat at a higher temperature than the temperature at which it now comes out, a temperature at which it can be used, and then we have to take that heat and convert it into actual mechanical power, electricity, or other usable forms.

We have done the first part of this problem. We have converted nuclear energy into heat, and, actually at the Hanford plants, the heat was a handicap rather than something that was desired. The Hanford plants were designed first and foremost as a war production measure to manufacture plutonium for use in atomic bombs. The amount of plutonium to be used in these bombs was limited solely by the rate at which the heat of the reaction could be dissipated. The heat was a hindrance rather than a help.

But when we come to the question of the future, our whole philosophy will be turned around. Then the plutonium will be a by-product and the heat will be the thing we are looking for. We have to say then one other thing, too, that the kind of reaction that we are going to use in the future so far as we know now, will be the same kind of reaction that we are using at Hanford, the division of the heavy atomic nucleus into two parts, with release of a large amount of energy, manyfold greater than released in any ordinary chemical reaction, and one other thing about this reaction that will carry on into the future so far as we know—that is, we must use uranium—that is the material which is our starting point.

Workers Need Protection

Granted, then, that the pile of the future must use uranium, the real problem is to extend the kind of machinery, the kind of so-called pile that we now have so that we can take the heat out, feed it through a turbine and make power out of it, but there is one very striking feature about this reaction which controls

what we can do with it, the applications we can make of it. A reaction that is so energetic as this liberates particles of a very special type which are extremely difficult to stop. We have the difficulty of protecting the workers in that neighborhood from radiations that come from the reaction, and this so-called shielding property is going to control what we can do about the plant in the future. The shielding problem has to be solved by interposing between the plant and the workers thick barriers of iron or other materials.

There is one thing that we can say about this shielding problem, that the principles involved in shielding are so straightforward and so simple that there is no trick that we can use to overcome this difficulty—simply a question of weight of material and thickness of material.

Heavy Weight Per Kilowatt

I would say, Dr. Conant, that that question of shielding is the starting point of our dicussion. It implies that if we are going to build any kind of plant, even a plant giving a power as low as a hundred kilowatts, that that plant must weigh something on the order of fifty tons, just from the point of view of a shielding which is absolutely necessary from the standpoint of protection.

CHAIRMAN CONANT: Would any member of the panel like to ask a question right now to bring out any basic fact? If not, let's consider first of all the problem which has been much discussed in the papers. What are the chances of getting at any time a power plant suitable for running an automobile or airplane? Who would like to try that?

DR. CRAWFORD H. GREENEWALT: I think you have the answer. If a power plant with one hundred horsepower weighs fifty tons, it seems there is very little chance of running either an automobile or plane. As a matter of fact I should think it would be almost impossible with that weight limitation imposed.

CHAIRMAN CONANT: That looks then as though the use of this power for automobiles and planes seems to be out of the question for technical reasons. How about a locomotive? Does somebody think it could be used for that?

MR. KEITH: That is in the twilight zone. You could conceivably have a locomotive in which you could use an atomic plant, and I believe some of the panel believe that is possible, but I don't foresee the use of power plants in a space as small as would be allowed in a locomotive, which must pass through bridges and under tunnels and what not. I think that is a little too fantastic.

MR. THOMAS: Purely from the technical side and leaving out the economics, locomotives are on the border line.

CHAIRMAN CONANT: How about ships?

GENERAL GROVES: I think I can answer that by saying that commercial ships of size, anything that is ocean-going, is probably the smallest moving vehicle that can be powered by atomic energy. Anything that you start with, fifty tons is the minimum weight, and you build it up not in proportion, but to some extent as you go up in power. It obviously requires a real ship and one which can afford a crew that can pay for itself. These piles are not going to be operated by men as we operate our electric refrigerators, by merely plugging them in. I think we will still have to have physicists, men trained in science and that means high wages, judging from my experience.

Atomic Power Plants

CHAIRMAN CONANT: Now, let's consider the question of stationary power plants. There, of course, are no restrictions on weight, and therefore this question of shielding and the weight doesn't come in in any way, but let's talk about whether they are technically feasible on the basis of our present knowledge . . . I am going to ask Dr. Wheeler again to start that discussion and then have others join in and agree or disagree with him as he proceeds.

PROFESSOR WHEELER: The question of stationary power plant brings up the shielding question again, the question of building the big barricade and there is another problem about it also—a health problem. That is the fact that any plant at this time produces sufficient materials which present a kind of radio activity hazard when they are taken out of the plant.

We have to congratulate ourselves on the wonderful success of the plant at Hanford from that point of view. Nobody has received any energy, but no doubt about it, it is an extensive job to protect people from the health hazards. That is one thing that must be solved for the successful use of atomic power in a stationary power plant.

There are other problems of nuclear physics which must be solved but Dr. Greenewalt, I think, can say more about the engineering side than I can. Do you want to take up from there?

Expert Sees Atomic Power Source

DR. GREENEWALT: I think we can see somewhat dimly, but nevertheless see fairly clearly the technical solution to the problems that confront us before we can have an atomic power plant delivering electricity to New York City. Of course, it must be clearly understood that we aren't there yet and there is a great deal of research both from the point of view of physics and engineering to be done before we can say we are there.

How long it will take is a matter of pure speculation—perhaps three years—as a great deal of effort is put on it—perhaps 10, perhaps longer—but from a strictly technical point of view—and I want it clearly understood, I am not talking economics at this point—I think it can be done.

CHAIRMAN CONANT: I take it from these two pieces of evidence that it can be done technically but the cost might vary enormously depending on the scientific unit.

DR. GREENEWALT: The size and other considerations.

CHAIRMAN CONANT: Then, making a small unit, obviously, won't be as economic as a large one. Does anybody disagree with that statement?

Now, therefore, there is a probability of a widespreading force, I take it, depending on the size of the unit and other considerations?

DR. GREENEWALT: But I think it ought to be clear that the problem is not merely one of size by a long shot.

CHAIRMAN CONANT: You want to name some of the other considerations?

Cost Important Factor

DR. GREENEWALT: The cost.

CHAIRMAN CONANT: That would be proportional in the way you have to do it and so on.

DR. GREENEWALT: The way you have to do it.

CHAIRMAN CONANT: Which is all in the future. In all these discussions that I have heard by the groups, there is always the question, "At what cost can I compete with the present situation in this country or elsewhere?" That brings up whether, indeed, there is a wide variety of costs of power which find different applications in different parts of this country for different special purposes and whether that applies in even a larger extent if we considered the whole world and take into account countries like Indo China where those little powers now develop.

I think Dr. Thomas has some interesting considerations on that point. I wish he would say a few words about them.

DR. THOMAS: No doubt at the very outset we must all realize what power is—the cost of power is a relative thing.

* * *

I would say that, for example, in many manufacturing enterprises, it is often the case where you have raw material available but no power, and that is a factor that I think will be on the optimistic side in bringing about atomic power plants in the future, particularly is this true in the mining industry where you have certain ores in isolated places and you have the power for processing those ores.

A large power plant there, completely isolated, where it is not necessary to have transmission lines but you can build your atomic energy plant right on the site, allows you to, for economic reasons, pay more for that power than you would in locations where you have abundant coal and oil on the spot.

I think from there on, Dr. Conant, we can try to develop that.

CHAIRMAN CONANT: Does anybody on the Panel want to disagree with Dr. Thomas on this point or add anything?

GENERAL GROVES: I would like to point out one thing and that is when he talks about using this power in mining operations and the like, that it does have one disadvantage. If you put in a diesel plant for mining operations or processing operations, you can move that plant when your raw material is exhausted.

I don't know just how easy it is going to be to move one of these plants that has been built in a stationary position once the thing is exhausted.

DR. GREENEWALT: I would hate to undertake to move ours.

GENERAL GROVES: We have often wondered what we would do if we were told we had to move it.

CHAIRMAN CONANT: I take it it is no military secret.

DR. GREENEWALT: It is heavy.

MR. KEITH: I would like to make one statement about the cost of power that Mr. Conant touched on. If you make an assumption that atomic energy costs nothing, which is impossible, and that the cost of the atomic power plant would compete in capital cost with a steam power plant, which I think is unlikely, even then a householder couldn't expect a more than an eight to ten per cent reduction in his electric bill and a large user of electric power couldn't expect more than a 25 to 30 per cent reduction in his collective bill.

Electric Power to Stay

CHAIRMAN CONANT: Am I right in summing up this part of the discussion in saying that at least the first uses of atomic power will come in under special conditions of the type that Dr. Thomas is speaking about and not to replace our present electrical power energy in the United States? Does anybody disagree with that?

DR. THOMAS: I agree with that.

CHAIRMAN CONANT: The question is where those special uses might be found and the extent that they might prove important in the near future.

GENERAL GROVES: I think also, though, that such a plant, at least, until we know a lot more than we know now, should be located on a railroad.

DR. WHEELER: There is another angle about the whole thing that might be brought out and that is the fact that our real problems now are problems of heat transfer. These plants out in the State of Washington are really beautiful the way they run, so quietly and smoothly and simply from the standpoint of nuclear physics. This neutron chain reaction is really a marvel from that point of view, but the real thing that limits our use of that reaction for power producing purposes is just this old engineering problem of heat transfer. That is the thing that costs the money and that is why you are limited on the amount to which we can reduce the cost in the future.

CHAIRMAN CONANT: I take it nuclear physics is easy and engineering is tough, is that it? Anyone disagree with that?

Now, perhaps, we can come to the point of, When is all this going to happen? which is certainly not without its interest, and, clearly, to answer that question in general terms, I am going to try to pin it down by agreement in advance by asking all these gentlemen one at a time to guess on this. How long will it take to develop a power plant of, say, 100,000 kw capacity which could compete with coal selling at $15 a ton?

That is a very definite specific problem and brings in economics as well as research and development and production. General Groves, do you want to try that first?

Atomic Power Require Decades

GENERAL GROVES: I think that is a matter of decades rather than a matter of years and when you start moving into decades, you are moving into a time period that is not of much personal interest to me. I feel very much as I have about certain other things in connection with this project, that we had something to do and we did it and we let our children worry about how to handle it in the future.

There are very difficult engineering and construction problems. Also, there are many nuclear physics problems and chemistry problems. I can speak with authority on the problem we were faced with in the past. I can speak, I think, with some authority on the construction and operation problems of the future based on past experience. The construction problem has been greatly underemphasized by everybody who has talked on this subject. It is not simple.

The most difficult tolerances are required and the very best material and tremendous amounts of it and it requires the very highest skill and the plant is subject to easy sabotage not only in time of war but due to labor difficulties or due to sudden insanity, either actual insanity or one of temper of one of the people operating the plant.

All of those things mean a long period of time in my estimation before we can talk of such a plant being economically

feasible under those conditions. That does not mean that if the price of coal goes up to $100 a ton in some particular area for some reason that they will still remain uneconomical. We are talking about the $15 a ton price.

CHAIRMAN CONANT: Mr. White, you have had a lot of experience with production, do you want to take a chance of looking in the crystal ball and taking a guess at this whole thing?

Production Expert See Problems

MR. WHITE: General Groves talks about decades—I don't want to be on the negative side and not be optimistic of what can be accomplished by way of operation, development and so on, I do think he is one hundred per cent right in saying that when we try to compare this power type of generation the normal type of power generation, we are not talking about a normal power plant, we are talking about many other things. We are talking about what you do with other products that you produce.

Those other products, as the Japanese know, are quite potent. They can't be kicked around and hauled out flatly. Many problems would come along with the operation that wouldn't be normal with a power operation at all. There is just a simple one—if we can call it simple—of protecting radio active materials. You think about that for a minute and you will realize that the general public is going to be somewhat concerned about what happens to them if they are within a mile or two of this point or maybe 10 miles of this point. Where you locate this plant is going to be of a lot of interest to the people who live down the stream perhaps.

There are many problems here outside of the normal operating problem, but I would like to point out that in the ordinary course of events, from the time that a man gets a germ of an idea—some of our good doctor friends here get a germ of an idea every 15 minutes—but from that time to the time that product gets on the market, there usually is anywhere from 5 to 7 years and that has the urge and the economic urge, people are trying to get it on the market, trying to make a dividend out of it.

It has to go through laboratory work, scientific work, development, then you build a plant and the plant doesn't work and you have to change it. That is the usual thing so when one starts talking about any short length of time, I think it is entirely practical to feel that it will be many days before this kw plant starts delivering power to New York City.

CHAIRMAN CONANT: Thank you, very much. We have had two men believe it will take decades. Mr. Thomas, I have a hunch you are more optimistic, perhaps, in the point of time, at least, than those who have expressed their views so far.

DR. THOMAS: I really hate to disagree with my Commanding General, in public at least, but I think he is a bit too pessimistic and he has gone through enough to make him a bit pessimistic, I will assure you, but I think that in answering that question, if you consider that there are no other developments on the horizon which will enter into play in this, I am sure you are quite right, but that I don't subscribe to. And . . . I think, in the matter of a lesser time we will have atomic energy plants in the United States. Of course, that depends on a lot of things. It depends on what time we get started on them. After we start to develop this, it also depends on the cooperation between the academic scientists and industrial scientists to see that these new things can be developed, but given that opportunity, I am a bit more optimistic than the other two speakers.

CHAIRMAN CONANT: You think perhaps, then, it is a matter of a decade? You will go as far as that?

DR. THOMAS: Yes, I think that it is certainly possible within a decade.

CHAIRMAN CONANT: This is a very interesting session. There is no question about that. Mr. Keith, what do you think?

100,000 KW Atomic Plant in 10 Years

MR. KEITH: I am a little surprised at General Groves. He stepped out of character a little bit. Of course, during this Manhattan Project a decade—you couldn't even talk to him about ten months. You had to talk to him about two months. I am glad he changed his mind.

I think if enough development and research work were done, you could answer the hypothetical question, "How long would it take to build a power plant to produce a hundred thousand kilowatts, coal being $15 a ton, and have that power plant operate economically?" I believe I would have to string along with Mr. Thomas and say I think it could be done in ten years but that is on the assumption that intensive research and development work can be done.

CHAIRMAN CONANT: Do you want to defend yourself?

Wartime Advantages Listed

GENERAL GROVES: . . . I think when it comes to time we have got to realize that in the work during the war we had a tremendous advantage. We had the power of decision. If this job is done by private industry entirely, they have got to face their boards and their stockholders who say that they will put up the millions of dollars that will be involved on the say-so of a few people, with a great many people of equal standard and stature, stating that they are going about it the wrong way.

We were faced with that throughout this project, but we had the power of decision, and the decision was made. If it was done under Federal guidance in time of peace, everyone who wanted to be heard would be heard before whoever was deciding it could go ahead.

I told the Senate Committee the other day in response to a question as to how long it would take me to do this over again, I said two years if we had the same conditions as before and knowing what we know now, but if we were doing it out in the open under the supervision of the American people it would take at least five years, and it might take ten or twenty. Maybe we could never get it done.

I think that is something that gets on the practical side just as much as saying it would be economically feasible; it must be possible from the practical standpoint. I think those were things that some of these gentlemen were shielded from by me during this work. We had one goal and that was to get it done. We didn't mind taking chances. We took them right straight through and fortunately most of them turned out right.

* * *

Atomic Energy and Coal Compared

CHAIRMAN CONANT: Mr. Greenewalt, do you think it is a fair comparison to make of atomic energy and coal at $15 a ton?

MR. GREENEWALT: I don't think it is a fair comparison.

CHAIRMAN CONANT: Which do you think is more difficult?

(*Continued on page* 366)

Significance Tests for Industrial Injury Rates

By D. C. Stewart

Chairman, EEI Accident Prevention Committee, and Safety Supervisor
Niagara Hudson System, Buffalo, N. Y.

LISTEN in on the conversation when safety men get together and it isn't long before you hear the words "frequency" and "severity." Apparently we can't get along without these quantities in accident prevention work. But, after listening to endless discussions about them and the surprising ways in which they are sometimes used to prove a point, one wonders if we get along well *with* them.

Most certainly we ought to have some idea of the rate at which injuries are occurring and we should have some measure of how bad the injuries are when they do occur. Frequency and severity rates are supposed to do that much for us. Why, then, are they such a troublesome pair? This article will explore some of the reasons and offer a few suggestions for a somewhat different approach to the problem.

Frequency and Severity

By definition the frequency rate is the number of injuries per million man-hours of exposure, and the severity rate is the time charge in days per thousand man-hours of exposure. Expressed as equations these are:

$$\text{Frequency Rate} = \frac{\text{Number of Injuries} \times 1{,}000{,}000}{\text{Number of Man-Hours of Exposure}}$$

$$\text{Severity Rate} = \frac{\text{Total Time Charges in Days} \times 1000}{\text{Number of Man-Hours of Exposure}}$$

The real meaning of the so-called "severity" rate has appeared to be less understood than the frequency rate. Certainly few will deny that the frequency rate has been used far more as a measure of safety performance. Sometimes it is set up as the sole criterion of performance as, for example, when a "winner" is named in a safety contest conducted solely on the basis of frequency.

"Sure," says a disgruntled safety man, "they had a frequency rate less than half ours, but in that company they don't have a lost time accident unless a man's away for 30 days. Had a couple of fatalities too, and they don't count one bit more in their frequency rate than any of the one or two day accidents that plaster our list. What's fair about that? We don't try to bring 'em in on stretchers, even if it does hike our frequency rate." Does that have a familiar ring?

But the "severity" half of the frequency — severity combination, when given its day in court, doesn't have a very convincing story to tell for individual companies. Not only is its meaning obscure, but the presence or absence of fatalities or substantial time charges for permanent partial disabilities toss this rate around in a bewildering manner. The safety man who has tried to spot a trend in a time series of jagged peaks and valleys of "severity" rates is well aware of this fact.

The belief that neither rate by itself tells the whole story has led many safety men to try to compress the two rates into a single performance measure. The search for some neat way of doing this has been pursued with about the same zeal as was the search for the fountain of eternal youth, and it seems with the same success. Some multiply the two rates and some even add them directly or weigh one and then add it to the other, all resulting in something which appears to be neither "fish, flesh nor fowl nor good red herring."

The ironic part about this age-old search is that of all the "single" measures of safety performance the one which comes nearest to meeting the specifications has been with us all the time, masquerading under the assumed name of "severity" rate. In reality this rate is a joint function of *both* frequency and severity, and therefore in some degree a measure of both.

In support of this statement it will be helpful to start by relating the two rates to each other in a single equation, as follows:

$$\frac{\text{Number of Injuries} \times 1{,}000{,}000}{\text{Number of Man-Hours of Exposure}} \times \frac{\text{Total Time Charges in Days}}{\text{Number of Injuries}} = \frac{\text{Total Time Charges in Days} \times 1{,}000}{\text{Number of Man-Hours of Exposure}} \times 1{,}000$$

A glance at the equations for the frequency and "severity" rates previously given shows that this equation may be stated in the following words:

The frequency rate times the average time charge in days per injury is equal to the "severity" rate times 1000. Using symbols this is:

$$f \times d = 1{,}000\ s$$

Where f is the frequency rate
d is the average time charge in days per injury
s is the severity rate.

The variable "d" is the average severity of the injuries that go into making the frequency rate, *related to the injuries themselves* and not to the man-hours of exposure over which they occurred. This quantity is entitled to lay powerful claims to being the true severity measure. If these claims are allowed the variable "s," being a joint function of frequency and average severity, then becomes the "frequency-severity index," the "overall performance index" or simply the "performance index." The term "performance index" will be used hereafter when referring to this quantity in this article.

Let us see how these concepts appear in action. Suppose that Company A worked 1,000,000 man-hours last year, had 10 disabling injuries and was charged with 400 days. Suppose that Company B worked 1,000,000 man-hours, had 20 disabling injuries and was also charged with 400 days. A comparison of the present and suggested methods is given in the table below.

	PRESENT		*SUGGESTED*		
	Frequency Rate	*Severity Rate*	*Frequency Rate*	*Average Severity*	*Performance Index*
Company A	10	0.40	10	40	0.40
Company B	20	0.40	20	20	0.40

The present method shows Company A to be better than B on the count of frequency and equal to B on the count of "severity." Being better on one count and equal on the other, A might very

logically claim that its performance is better than B's.

The suggested method shows Company A to be better than B on the count of frequency as before, but worse than B on the count of average severity. Being better on the frequency count and worse on the average severity count results (in this case) in A having the same performance as B, which is quite a different story from that told by the present method.

Modern statistical theory permits us to evaluate the performance of individual companies by testing the significance of deviations from average of the three measures, frequency, average severity and performance index. The procedure will now be developed.

General Theory and Procedure for Significance Testing

The conditions that cause industrial injuries and determine their resulting severities are numerous and complex. They combine in endless ways to produce injuries and differing severities of injuries. However, where the system of causes is relatively constant, fluctuations in the frequency and in the severities of injuries tend to follow laws.

The frequency of injuries tends to follow a law known as Poisson's law. Likewise the average severity of temporary total disabling injuries tends to follow another law.

These facts enable us to weigh the significance of deviations from average of frequency rates, average severities and performance indexes among companies within an industry.

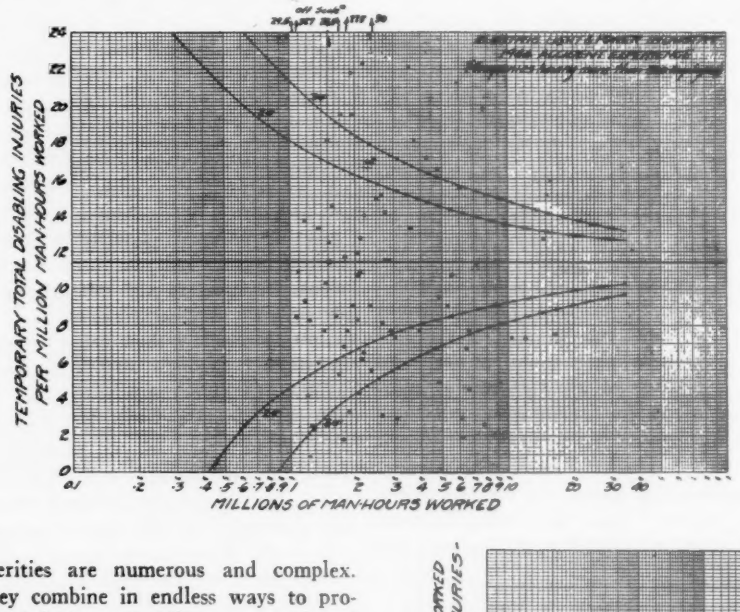
We start by *assuming* that all companies are exposed to approximately the same hazards and that their basic level of safety performance is about the same. Limits are then set above and below the average of the industry's statistical measures such that the probability is remote that individual company measures will attain these values solely from the chance combination of injury producing causes.

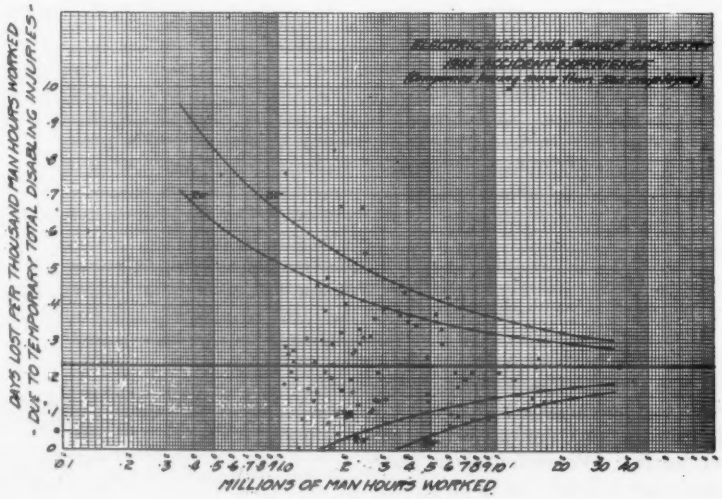
If an actual individual measure is found to lie beyond these limits, we can then suspect very strongly that the assumption with which we started is untenable for that company. There must be reasons for its performance which cannot be explained by chance fluctuations alone. In other words, its performance is significantly better (or worse as the case may be) than the industry's average.

Limits were set at two and three times the standard deviation* above and below average. The standard deviation for frequency was calculated from the Poisson formula. The standard deviation for average severity of temporary total disabling injuries was calculated from individual reports on 2593 injuries which occurred in the electric power industry in 1944, comprising more than half of the total named in the EEI annual report. The standard deviation of the performance index for temporary total disabling injuries was calculated from the standard deviations of frequency and average severity.

It was previously noted that the presence or absence of fatalities or substantial time charges for permanent partial disabilities toss the present so-called severity rate around in an extreme manner. This is true also with the suggested average severity measure. The way out of this dilemma is to make separate significance tests of frequency rates of temporary total disabling injuries, of permanent partial disabling injuries and of deaths and permanent total disabling injuries. Likewise separate significance tests may be made of average severities as well as performance indexes covering temporary total disabling injuries and permanent partial disabling injuries. Deaths and permanent total disabling injuries require no significance tests of severity since they all carry the standard time charge of 6000 days.

The sample of 2593 individual injuries referred to above was sufficiently large to furnish a highly reliable value of the standard deviation for temporary total disabling injuries. There were not enough permanent partial disabling in-





* The standard deviation is a quantity which measures the "spread" of a distribution about the mean. It is defined and its use explained in any text book on statistics. The symbol for the standard deviation is the Greek letter σ (sigma).

juries in the sample to yield reliable values for their average or standard deviation. Significance charts are, therefore, presented for the frequency, average severity and performance index and for the frequency of deaths. There is no reason why similar charts could not be presented for permanent partial disabling injuries if sufficient data were available.

Each dot on these charts represents the position of a company. The location of the dots was determined from the EEI compilation of 1944 accident statistics and includes the 86 companies with more than 500 employees. The significance of departures from average of the smallest company in the group is directly comparable with those of the largest, since the tendency toward wider swings in the measures with smaller exposures are automatically cared for in locating the limit lines.

Interpretation of Charts

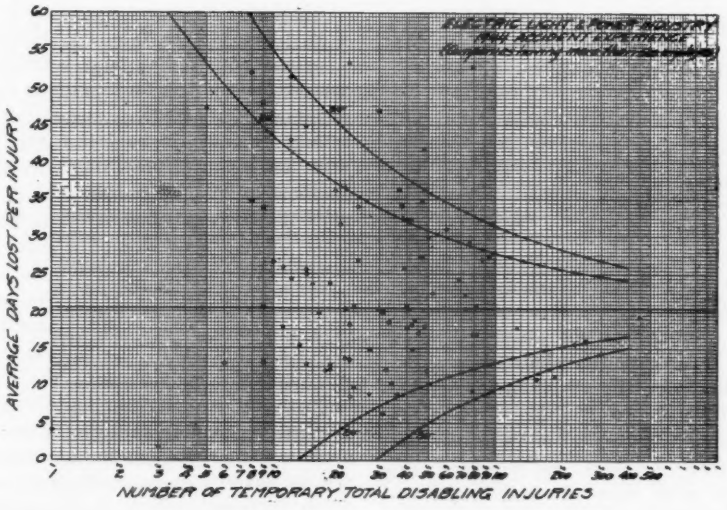
The lines marked 2 σ and 3 σ on the charts may be termed roughly the "high" and "extreme" significance limits respectively. Individual measures lying above the upper lines should occasion concern and lead to investigation to discover the causes. This is particularly true of the upper line, since the probability that a measure will exceed this value through the workings of chance alone is so small as to practically preclude chance fluctuations as an explanation.

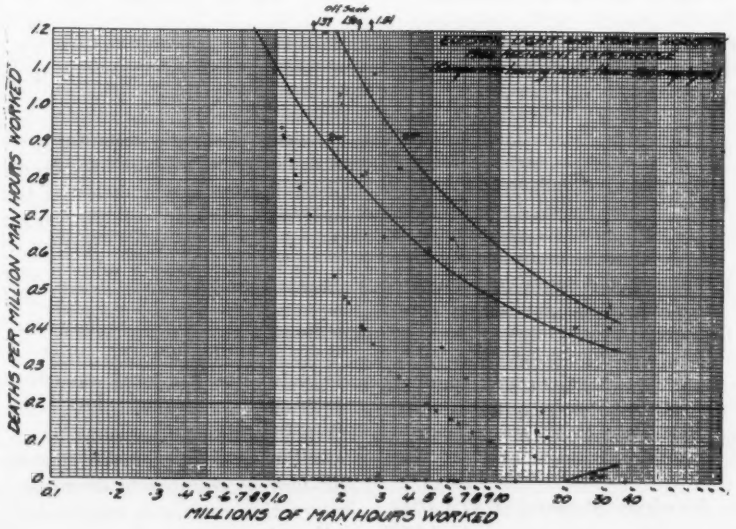
Individual measures lying below the lower lines, on the other hand, furnish strong presumptive evidence of superior performance so far as those particular measures are concerned. But it must be remembered that excellent performance on one count is by no means evidence of good overall performance. Low frequency, for example, is often accompanied by high average severity, resulting in a mediocre performance index. All of the measures must be considered if a complete appraisal is to be made.

If our tentative assumption that every company was doing an "average" job was indeed true, we should expect to find practically every company lying between the two outer limit lines on every count. Since this is far from the case, we can say immediately that the measures are far from controlled. This is most noticeable in the case of the frequency rate. That is not surprising when it is considered that in addition to the effectiveness or ineffectiveness of accident prevention work there are many other factors which may influence the frequency rate such as varying compensation laws, pay policies for time off, vigor of follow-up after an injury, existence of or lack of special inducements to injured persons to return to work, and the like.

When we examine the performance index chart we find a better state of control. Fewer companies lie beyond the limit lines. This might be expected from observations made during the course of this study that a high frequency rate is often accompanied by a low average severity and a low frequency rate is often accompanied by a high average severity.

The chart for testing the significance of fatality rates is interesting. One company reporting no fatal injuries over a large exposure was able to place itself outside the lower 2 σ limit line and is certainly entitled to take pride in its achievement. This does not mean, however, that other Companies reporting no fatalities and lying inside the limit lines may not be doing as good a job. It simply means that they do not have enough man-hour exposure in one year to prove that their record is statistically significant. Therein lies a point for all of us.





One year is too short an interval for most of us to test for significance of zero fatality rates. In fact, if we study the chart we find that a company must have had no fatal accidents in 20,000,000 man-hours of exposure before it can say that its performance has high statistical significance.

Let's put it another way. Divide 20,000,000 by your yearly man-hours worked. The result is the number of years that your company would have to work without a fatal accident before you could consider your performance to have high statistical significance.

(*Continued on page 372*)

Important New Data in Standards For A-C Power Circuit Breakers

By H. R. Summerhayes and G. Sutherland

THE American Standards for Alternating-Current Power Circuit Breakers, C37.4-1945 through C37.9-1945 inclusive, were approved by the American Standards Association in May and have now been received from the printer, grouped in a single paper-bound publication. This is the third such project completed by the ASA Sectional Committee on Power Switchgear. It is a revision of the proposed Standard and Recommended Practices (C37.4 through C37.9) printed in January, 1941, for trial use and criticism, by the American Standards Association. This revision incorporates much new material from AIEE Standard 19-1943, which it will supersede.

What It Covers

A-c power circuit breakers are defined, for the purpose of this standard, as comprising such of the following as have rated voltages higher than 600 volts:

(a) Oil circuit breakers
(b) Circuit breakers using liquids other than oil
(c) Air circuit breakers

Thus, virtually all oil circuit breakers are covered. In addition, high-voltage a-c circuit breakers of oilless types (e.g., air circuit breakers, and breakers using liquids other than oil) and breakers of the low oil-content type are governed by this standard.

Bound into the same publication, for convenience, are the following American Standards:

Alternating-Current Power Circuit Breakers, C37.4-1945

Method of Determination of RMS Values, C37.5-1945 (This material was an appendix to AIEE Standard 19-1938).

Tables of Preferred Power Circuit Breaker Ratings, C37.6-1945 (Materially changed from 1941 publication).

Standard Operating Duty for Reclosing Service, C37.7-1945

Standard Rated Control Voltages (and their ranges), C37.8-1945 (Adoption of this as an American Standard should have a healthy stabilizing influence that may extend to other classes of electrically operated or controlled equipment).

Test Code for Power Circuit Breakers, C37.9-1945

New Features, As Compared with AIEE Standard 19-1943

Although the 1943 AIEE Standard included a general table of impulse test voltages, the corresponding tables in the new American Standards show test voltages not only for available but also for future contemplated voltage ratings.

The major novel feature, not found in any previous national standard (other than those of the National Electrical Manufacturers Association) is the inclusion of tables of preferred circuit breaker ratings. Adherence to these preferred ratings (printed in bold face type) by users and manufacturers should result in economy to both, as compared with previous practice. Whenever a manufacturer, at the insistence of a good customer, yields to the temptation to build a circuit breaker (or other piece of equipment) of other than standard construction when equipment of standard rating will meet the requirements, the entire industry suffers. By purchasing circuit breakers of standard ratings, the number of ratings that must be built is reduced and the quantity of standard-rated breakers is increased. This makes quantity production possible, with consequent reduced cost.

Most of the credit for this reduction in the number of standard ratings of circuit breakers is due to the EEI-AEIC-NEMA Joint Committee on Power Circuit Breakers. Subject to the approval of the sectional committee (C37) and its Power Circuit Breaker Subcommittee, the "Triple-Joint Committee" decided what ratings could safely be eliminated and still allow good application coverage for power systems.

None of the material covered by American Standards C37.5-1945 to C37.9-1945, inclusive, appeared in AIEE Standard 19-1943.

Principal Changes Since 1941

In American Standard C37.4-1945, which is the counterpart of AIEE 19-1943, the following notable changes appear, as compared with the proposed standard, C37.4/9, published by the ASA in 1941.

1. Service conditions have been written to agree with AIEE Standard 1B, May, 1944. When the circuit breaker is of suitable construction as specified in the standard and the altitude does not exceed 3300 ft., operation of the breaker itself in air temperatures as high as 55 C. is now permissible (instead of 40 C.), with the same permissible temperature rises as previously. In the temperature tests of such circuit breakers mounted in enclosures, the average air temperature may be measured inside the enclosure and the standard rise above this average inside temperature is permitted for the breaker; or the ambient temperature may be measured outside the enclosure, in which case the standard rise is allowed above this outside ambient plus 15 C. Suitable construction for such performance is provided if the circuit breakers have all contacts silver surfaced or equivalent, and in addition have all conducting joints, including terminal connections, either

(1) soldered or silver surfaced and separately held mechanically, or
(2) brazed, welded, or silver soldered, and provided that such operation does not result in total temperatures in excess of 90 C. for Class O, 105 C. for Class A, and 125 C. for Class B insulations.

2. Wet dielectric tests for complete outdoor circuit breakers have been eliminated because a wet dielectric test affords no additional information on the adequacy of design of the interior of the circuit breaker, beyond what is revealed by the dry low-frequency and impulse tests. Bushings used in power circuit breakers must, however, meet AIEE Standard 21-1942, which includes a 10 second wet (withstand) low frequency dielectric test.

3. Power circuit breaker nameplates will now be required to show the rated interrupting current at rated voltage, as well as the rated impulse withstand volt-

age. The latter requirement was also found in AIEE Standard 19-1943.

4. For the first time in any national standard, it is recommended that "a" auxiliary switches be shown on electrical diagrams as normally open contacts. Conversely, "b" auxiliary switches are to be shown as normally closed contacts.

5. Most of the definitions have been omitted, except for those peculiar to circuit breakers. All other definitions will be found in the American Standard Definitions of Electrical Terms, C42-1941.

In American Standard C37.6-1945, the schedule of preferred ratings for power circuit breakers has been subdivided into four tables, viz:

Table 1. Indoor Oil
Table 2. Indoor Oilless
Table 3. Outdoor Oil
Table 4. Outdoor Oilless and Low Oil Content.

The minimum operating voltage and the insulation test voltages have been added, for convenience, to all tables and the rated interrupting time, in cycles, is also indicated. These tables therefore serve as a complete guide to the selection of circuit breakers. Bold face type is used for ratings now available. Italics are used for ratings that are only listed as a guide for future development, if and when required. All ratings in Table 4, for instance, are in italics.

It will be noted that the 5-second rating is now to be numerically equal to the maximum interrupting current rating in all cases.

In Table 1, only 28 standard ratings remain, compared with 41 appearing in the January, 1941, publication, and the table includes only breakers rated 5 kv or higher. Only 20 of these are bold face (recommended) ratings.

Tables 2 and 4 had no exact counterpart in the January, 1941, publication.

Although still containing 48 ratings as previously, Table 3 contains numerous changes. The ratings now standard include more circuit breakers of high interrupting rating than hitherto. Ratings of 3,500,000 kva for future development are listed for 138 kv and higher voltages, and of 5,000,000 kva for 287.5 kv and above.

For breakers rated 115 kv and above, the 800 ampere rating is now standard, instead of 600 and 1200 amperes, except that two 1200 ampere ratings are retained (one each in the 115 kv and 161 kv classes). For breakers rated 230 kv and above, the 800 ampere rating is the only one listed.

In the 115 kv class, instead of four ratings, only three are now listed. The 500,000 kva and 1,000,000 kva breakers are no longer standard, but a 2,500,000 kva b eaker is now listed.

In the 138 kv class, there are likewise only three breaker ratings listed instead of four. The 750,000 kva breaker is no longer standard, but breakers of 1,500,000, 2,500,000, and 3,500,000 kva are now listed.

In the 161 kv class, three are listed as compared with two previously. The new listings are for 2,500,000 kva and 3,500,000 kva. The 1,500,000 kva breaker is no longer listed.

The bibliography following the test code (C37.9-1945) has been materially expanded and minor changes made in the test code itself.

With the comprehensive coverage included in this group of standards, it promises to be the most widely used publication in this country on power circuit breaker performance and testing.

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Copies of the American Standards for Alternating Current Power Circuit Breakers, C37.4-1945 through C37.9-1945, in one volume, are available from the American Standards Association at $1.25.

Frank A. Newton

FRANK A. NEWTON, Chairman of the Rate Research Committee of EEI and its predecessor the NELA for 15 years, and for many years in general supervisory charge of rates for The Commonwealth & Southern Corporation system died Nov. 16 of a heart attack in Peoria, Illinois.

Mr. Newton was born in Sparta, Wisconsin, May 21, 1884, and after attending the college of Engineering at the University of Wisconsin spent some time in Colorado with the U. S. Reclamation Service and U. S. Geological Service and later was engaged by the Wisconsin Railroad Commission. In 1912, he joined the staff of Hodenpyl Hardy & Co. in connection with public utility rate and valuation matters and when The Commonwealth & Southern Corporation was formed in 1929 he was placed in general supervisory charge of rates for that system. Mr. Newton was also a former Chairman of the Rate Committee of the American Gas Association and was a frequent contributor to technical and trade publications on matters pertaining to rate and valuation matters.

At a recent meeting of the Rate Research Committee of the Institute the following resolution, expressing the sincere feelings of all its members, was adopted:

RESOLVED, that as members of the Rate Research Committee of the Edison Electric Institute assembled in the meeting arranged by and being carried out in accordance with the wishes of Mr. Newton, we record this expression of our profound sorrow and sense of personal loss at the death of our Chairman, Frank A. Newton.

Frank A. Newton had been Chairman of the Committe since the formation of the Edison Electric Intitute in 1933 and previous to that Chairman of the Rate Research Committee of the National Electric Light Association for the years 1931-32, 1932-33, and Vice Chairman in 1930-31.

As a pioneer in the field of rates and regulation he unselfishly contributed much not only to the Committee but also to the electric light and power industry as a whole. Universally recognized as the dean in the rate field, no problem was too small and none too big for him to give unstintingly of his time to help in solving.

Professionally he held the highest respect of the industry for his able clarification of abstruse and intricate problems involved in the questions of ratemaking and regulation and at the same time obtained the deepest personal affection and loyalty from all his associates.

Now, in grateful remembrance of his labors with us and acknowledgment of the value of his friendship

BE IT FURTHER RESOLVED, that these heartfelt expressions of esteem and sorrow be entered in full on the record and that a copy be transmitted to Mrs. Newton, to his son, and daughters, and to The Commonwealth and Southern Corporation in token of our sympathy and as evidence of our admiration and our affection for Mr. Newton.

Atomic Energy

(*Continued from page* 360)

MR. GREENEWALT: Atomic power to compete with coal at $15 a ton is more difficult than making the atomic bomb, starting from where we are because after all the economics of the atomic bomb were not fixed. The economics of coal at $15 a ton is a very real thing.

CHAIRMAN CONANT: Dr. Felbeck, do you want to take a guess as to how long you think it would be from your experience and from what you have heard in this discussion both here and during the rehearsal.

DR. FELBECK: I would like to go back to Mr. White's remarks. He pointed out that any formal industrial project was five to seven years from the laboratory to final culmination. That is on the basis that you have already got the economics figured out, and it looks like a money-paying proposition.

Here is one that when you sit down and put the numbers down on the paper, it just shows that that is an impossibility. Faced with a solution of the economic problem on top of the engineering, scientific problem, I think that three years to 10 years is a bit short. I would make it 15 to 25 as a guess.

DR. GREENEWALT: I would like to say one more thing about this economic matter. This cost two billion dollars, I think the paper said. If you divide two billion dollars by the total kilowatt hours that were produced, I think you would get very gold-plated power.

MR. KEITH: I would like to point out that this assumption of $15 per ton for coal may not in all cases be a proper assumption. You might be able to pay a good deal more than $15 a ton and make it economical. I think the rest of the panel would agree that if you would take a higher figure for coal, say at $30, that you could produce the power plant, say in a decade.

CHAIRMAN CONANT: Certainly in a shorter time, everybody would agree, I think.

MR. LAURENCE: I want to challenge the remark of Dr. Greenewalt about cost. It has cost us a lot of money at two billion dollars, but isn't it true that with the knowledge we have today, we could make it for considerably less?

GENERAL GROVES: I don't think we could. If we had to do it out in the open today it would cost us more money than it took us when we were able to do it without everybody telling us how.

CHAIRMAN CONANT: Even if you did it in camera, do you think you would do it for much less than about two billion dollars?

GENERAL GROVES: We could do it for less than two billion dollars, but not appreciably less. The main difference would be that in time of war we could have done it quicker because then we would have known that we were going to succeed and would have proceeded on that basis instead of knowing that we had a chance to succeed and having to hold back at certain times. You couldn't tell our workers that the minute you finish this job, the war is over. We may have thought that, but after all we didn't know the thing was going to go off, and we lost a great deal of work efficiency because of that, but I don't think we would gain much in worker efficiency now by telling them that the power plant was going to work. . . .

* * *

CHAIRMAN CONANT: . . . Since we have thrown the original question into the ashcan—we did so at the beginning—obviously I, as Moderator, shall not attempt to provide the answer or attempt to sum up this discussion. I will rather leave it to each member of the audience to draw any practical conclusions that he can from what he has heard but ask you all to bear in mind that we have all been trying to do the impossible this afternoon, namely, forecast the future. Thank you!

Customer Billing

(*Continued from page* 356)

emption classifications for each unit of control. These summary cards, a by-product of the billing procedure, are used to accumulate earnings and tax data and to set up the debit to an accounts receivable control which is maintained for future balancing purposes. The ledger record cards now contain all the necessary billing data and are ready to be used for the actual operations of preparing bills.

Billing

Punched holes representing, among other things, the customer's account numbers, reading dates, and due date are mechanically reproduced into the coupon and stub portions of the blank bill forms from the ledger record cards. The holes in the coupons are ultimately utilized to mechancially sort the coupons to the proper sequence when returned from the customers with their payments. The customer's bill including the stub portion which is later removed is the same size, although heavier in weight of paper, as the tabulating cards.

The bill forms and ledger record cards are now passed through a machine which prints the billing information on the billing side of the bill forms.

The billing information printed on each form is for the customer whose account number was reproduced into the same form. The bill forms then pass through a machine which reads the holes punched in the bill form to print the reading dates, due date, etc., across the top of the billing side of the bill. Making further use of the holes punched in the bill forms, the bills are mechanically matched with the name and address cards, and the customers' names and addresses are printed on the address side of the bills. The bills then receive a visual check to further assure accuracy.

Final Processing

The stub portion of the bill, which is of no further value, is then cut from the rest of the bill, thereby reducing it to post card size. The postal impression and postal zone number, if any, are placed on the address side of the bill, and the bill is mailed to the customer.

New advance cards are reproduced from the present ledger record cards and are used for the next billing. The present meter readings and reading dates in the current cards become the preceding meter readings and reading dates in the new advance cards. These new advance cards are then mechanically interfiled with the meter reading record cards in preparation for the next billing. The present ledger record cards are forwarded to an unpaid file to be withdrawn when payment is made. This file is the Accounts Receivable File.

This completes the story of the mechanical billing routine in The Detroit Edison Company. With new mechancial office equipment on the drawing boards and under construction which is adaptable to utility billing, we can foresee many revolutionary changes yet to be made that will lend themselves to further economies. The Detroit Edison Company is ready to take immediate advantage of this new equipment when it is placed on the market now that the war is over.

New Home Lighting Film Produced by Better Light Bureau

"SEE FOR YOURSELF," a new sound-slide film prepared by the National Better Light-Better Sight Bureau for use by utility home lighting departments, will spearhead the launching of new drives to point out the common faults of today's home lighting, and at the same time suggest remedies within the means of every home owner.

Swiftly paced, and pronounced by numbers of lighting authorities to be both authoritative and entertaining, the film is ideal for presentation before community groups such as parent-teacher associations, school staffs, civic and service clubs, home-making classes, church societies and older school children.

For years before the war, home lighting personnel of the electric utilities carried on educational campaigns to show their customers how poor lighting handicapped their eyes. Now after four years of little or no activity on home lighting, "See for Yourself" will stimulate customer thinking and study of their own home lighting conditions, and will prove exceptionally useful during the present period while home lighting departments are being developed.

The film employs the "before and after" technique to show the difference that good and bad lighting can make in ordinary seeing tasks. It attains complete believability through the naturalness and realism of its presentation. An audience will recognize its own experiences with improperly placed or poorly designed lamps, or when trying to read or work with insufficient light, as the slides are projected. While numerous points on the proper lighting of the home are graphically illustrated, the film holds to its main theme—"Why the home needs better lighting." Several of the later frames are designed to make each member of an audience take quick mental stock of the types and placing of lighting equipment in his own home.

Opening with a brief and entertaining history of the development of artificial lighting, the film shows the first crude attempts at home lighting with a single electric light bulb in the center of each room. As the science of lighting developed, the film continues, the need of different intensities of light for different seeing tasks became apparent. Pointing out the tremendous amount of nervous energy used up by the eyes in an average day, the film graphically portrays the effects of insufficient light, glare and shadows upon our physical well being.

Then a typical family, with each member engaged in work or play in the home is shown. Father strains to read with a lamp more ornamental than useful, mother works in her own shadow in the kitchen, daughter writes a letter in the semi-gloom of the living room desk, and junior builds a model plane in the basement with a bare incandescent lamp glaring into his eyes.

The light meter is cleverly brought into the film to drive home the difference between good and bad lighting in every one of the above tasks. Reduction of eyestrain and fatigue, a more attractive home, greater safety and prevention of accidents, faster, easier work and protection for the eyes of child and adult alike are all possible with Better Light for Better Sight, the film concludes.

The film consists of 105 frames, with a running time of 15 minutes. The production is the work of one of the leading sound-slide films of the country, with narration by a famous commentator. Record and print cost $30, and operate on any standard sound-slide film projector. Further information is available at the National Better Light-Better Sight Bureau, 420 Lexington Avenue, New York 17, N. Y.

Duquesne Light Company to Absorb Major Part of Electric Range Installation Cost

GEORGE W. OUSLER, Vice President in Charge of Sales, Duquesne Light Company, Pittsburgh, Pennsylvania, has announced a plan whereby the major portion of electric range installation cost in Duquesne Light Company territory will be absorbed.

Under the new plan, customers having their range on the first floor of a single family dwelling could have a standard range wiring installation made for a flat charge of $15.00. Formerly, high range installation costs that have been between $60.00 to $80.00 were a restraining factor that discouraged many customers from owning an electric range.

The plan appeals to both home owners and renters . . . should a customer move to another location within five years of the original installation, the company agrees to have a standard range wiring installation made for a charge not to exceed $15.00 This is an important point for consideration by the 50 per cent of the people living in Allegheny and Beaver Counties who are renters.

Mr. Ousler also stated that the Duquesne Light Company agreed to make liberal contributions toward the cost of installing electric range wiring in duplexes and apartments. He pointed out that the amount would vary depending upon the total cost of the range wiring job.

To be eligible for a standard range wiring installation the following conditions were specified: (1) the applicant must be purchasing service directly from Duquesne Light Company; (2) his range must be located on the first floor of a single family dwelling; (3) his range must consist of a thermostatically controlled oven with a minimum of three surface units and it must be the main cooking device; (4) the plan applies to conditions existing in the average residence. It does not apply to such cases where the building is served by underground service or is more than 100 feet from the company's overhead lines.

Included in the standard installation price of $15.00 is the replacement of wiring from the bracket of the house to and including the main switch, the range circuit, the range receptacle and the connections to existing wiring or distribution center.

The plan announced at this time supplements a previous announcement made by Mr. Ousler relative to Duquesne Light Company's basic sales policies. Previously Mr. Ousler outlined the following policies:

1. Duquesne Light Company will not merchandise appliances, but all appliances will

be sold by dealers.

2. In the existing wired homes, Duquesne Light Company will contribute to the cost of changing the customer's service entrance wiring to accommodate the operation of the range and water heater.

3. Duquesne Light Company will actively promote the sale of electric ranges and electric water heaters, as well as all other electric appliances and lighting equipment.

The new wiring plan not only saves the customer money for a wiring job but it also adds much to the value of the property. The larger service entrance makes it possible to use such electric devices as the electric water heater and clothes drier at a minimum of installation expense.

In presenting this new plan Mr. Ousler explained that the Duquesne Light Company will assign the installation job to an independent contractor who will complete the work within five to ten days.

Northwest Association Re-activates Committees

DECISION to re-activate several bureaus and committees that had lain dormant during the war was taken at two Section Executive Committee meetings of the Northwest Electric Light & Power Assn. in November. The Engineering and Operation Section which met in Portland, November 5 and 6 will set up the following committees with their chairman as indicated: Power Production, A. L. Pollard, Puget Sound Power & Light Co.; Transmission and Distribution, C. H. Kirk, The Montana Power Co.; Electrical Equipment, J. Hellenthal, Puget Sound Power & Light Co.; Utilization, John Bankus, Portland General Electric Co.; Code, S. B. Clark, Northwestern Electric Co. R. J. Davidson, Pacific Power & Light Co., is the chairman of this Section this year.

The Engineering Planning Committee under O. L. LeFever, Northwestern Electric Co., will undertake a study of the incremental cost of serving electric house heating. Several companies will participate, each estimating the effect of the house heating load on its system load curve and determining what will be the added cost per kva in substations, transmission, and distribution, to serve a hypothetical 10 per cent saturation of this load.

The Advisory Executive Council of the Business Development Section met in Butte, Mont., Nov. 9 and 10, with J. M. McKay, Portland General Electric Co., Section Chairman. This group took action to re-activate the Section's four pre-war bureaus: commercial and industrial, residential, rural and advertising.

The Commercial and Industrial Bureau will be headed by O. C. Mayer, Idaho Power Co., and will set up a special heating committee and a commercial and industrial lighting committee. It proposes to conduct sales training conferences on commercial cooking and commercial lighting from time to time when new sales personnel are recruited for these fields of utility selling.

Guy Davis, Pacific Power & Light Co., is to be chairman of the Residential Sales Bureau, which will have a Water Heating Committee working toward the standardization of water heaters; an Electric House Heating Committee now preparing a manual for the guidance of power salesmen and heater manufacturers; an Electric Home Committee to consider ways of promoting all home appliances; a Home Service Committee composed of the home service directors of member companies; and an Adequate Wiring Committee to stimulate promotions in this field.

The Rural Sales Bureau, with Karl Dimmitt, Puget Sound Power & Light Co., chairman, and the Advertising Bureau, under the chairmanship of Kimball Jack, The Washington Water Power Co., will function as committees of the whole.

A new committee called "Sales Promotion" was authorized with the principal function of setting up a program at the spring meeting of the Section or otherwise, for the participation of manufacturers, distributors, appliance dealers, and electrical contractors. This committee, which will be chairmaned by Henry Kruse, Puget Sound Power & Light Co., will have on it representatives from all these branches of the industry. This activity is in line with the Association's intent of broadening its scope to furnish a common meeting ground for all branches of the electrical industry in the Pacific Northwest.

Prime Movers Committee Meeting

THIS committee under the chairmanship of R. M. Van Duzer, Jr., of the Detroit Edison Company had its second meeting of four meetings scheduled for the year in New York, November 26 and 27. There were present 69 members and invited guests.

The work of the committee is divided among various subcommittees, such as boilers and combustion, turbines and condensers, boiler auxiliaries, gas turbines, and chemistry, all of whom submitted progress reports.

The committee is interested in starting some fundamental research on steam contamination from boilers to eliminate turbine blade deposits which have resulted in a great loss to the industry in reduction in efficiency and capacity and an increase in turbine outage. Other engineering associations and societies are also interested in this problem and a committee consisting of C. C. Whelchel, S. T. Powell, S. F. Whirl, and G. C. Daniels was appointed by the chairman to present a program at the next meeting of the committee for initiating the study of this problem which appears to be one of fundamental research.

Interest in the subject of pipe graphitization still continues and it appears that there is need for continuing fundamental research on this problem, especially if steam temperatures of 950 deg. and above are to be used.

Many topics were discussed at the Round Table session which was presided over by F. P. Fairchild of the Public Service Electric & Gas Company of New Jersey. These topics covered operating difficulties with various kinds of equipment, design features, and equipment failures.

Investors League Holds Utilities Forum

A UTILITIES FORUM was held by the Investors League in Chicago on November 29. It was addressed by members of Congress, utility executives and others. The Investors League, headed by B. C. Forbes, is a national organization of average investors, championing free competition and the rights of investors.

The Chicago Utilities Forum was one

of a series of clinics, two recent ones in New York having been concerned with "Management Compensation" and "Double Taxation." The League officers announce that an increasing number of Forums will be sponsored by them during the coming year.

The next Bulletin of the League will report excerpts from the speeches made at the Chicago Forum in November, whose nature and scope are indicated by the following typical headlines:

"U. S. Control of Utilities Condemned" (Chicago Journal of Commerce).

"Forum Assails U. S. Competing with Utilities—Use Tax Advantage for Socialism" (Chicago Tribune).

"Rap Tax-free Civic Utilities" (Chicago Herald American).

"Dirksen proposes Federal Office to Protect Security Holders" (New York Herald Tribune).

The Edison Electric Institute Medal

ON November 15, 1933, the Edison Electric Institute made available for award, a medal to be known as the "Edison Electric Institute Medal" for successful cases of resuscitation from electrical shock which occurred subsequent to January 12, 1933. They also appointed a Committee of Judges under the Prize Awards Committee to administer the awards.

The medal is available for award to employees of all electric utilities for meritorious cases of successful resuscitation from electrical shock by the Prone Pressure Method. The Committee of Judges is empowered, at its discretion, to make awards in cases where a variation not inconsistent with the fundamentals of the method is used; when it was impossible to use the method at all or when the application with sufficient promptness was not possible.

The metal used in the medal is bronze. The copper used in making the bronze came from the original Edison two-wire system originally installed in New York City under the personal supervision of Thomas A. Edison in 1881. In the award of the medal to a group of men such as a line gang, miniature replicas of the medal are awarded to the men. Suitable certificates are awarded, accompanying the medals and certificates of assistance are also available for award.

There is no conflict between the Edison Electric Institute Medal and the President's Medal of the National Safety Council, there being close liaison between these bodies presenting duplicate award of the Medals in a single case.

In reviewing the awards made since 1933 and having knowledge of the fatal and non-fatal electric shock cases, it is quite clear that there have been a number of cases of resuscitation from electrical shock for which no application for a medal has been made. Electric utilities owe it to their employees to make application when a life has been saved through the prompt application of artificial respiration. Nothing so stimulates interest among a group of employees as the suitable presentation of medals after a successful resuscitation from electric shock.

The application should be made over the signature of an executive officer of the utility to: Miss M. B. Woods, Secretary, Committee of Judges, Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y. Forms of application, together with provisions and conditions of award are available.

RECENT PUBLICATIONS

Reports of the Joint General Committee of Edison Electric Institute and Bell Telephone System on Physical Relations Between Electrical Supply and Communication Systems.

EEI Pub. M-5. 45 pages. No charge.

Joint Pole Practices for Supply and Communication Circuits.

EEI Pub. M-12. A report of the Joint Committee on Plant Coordination of the Edison Electric Institute and the Bell Telephone System, 44 pages. Price $.50 to members and their employees; $1.25 to nonmembers; and $1.35 to foreign countries. Quantity price—1 to 9 copies $.50; 10 to 49 copies $.40; 50 or more copies $.25.

Publication M-5, Reports of the Joint General Committee, constitutes a reprint under a single cover of three reports issued some twenty years ago on Principles and Practices for Inductive Coordination and for Joint Use of Poles, and Allocation of Costs. It is a tribute to the soundness of that early work that these reports are reissued at this time without necessity for major revision. It is recognized that as a result of advances in the art there are a few items in the Practices that should be re-examined and some new subjects that should be added. Shortages of manpower have made it impracticable to carry out this work at the present time. It will be undertaken in due course.

Publication M-12, Joint Pole Practices for Supply and Communication Circuits is a revision of the Joint Use Specifications issued as Publication E-3 in 1937. One of the more important changes is provision for normal joint use construction (Part 2 of the Practices) in situations involving supply circuits of more than 5,000 volts between conductors. These Practices relate to joint use construction in urban and suburban areas generally.

Activity in the field of rural electrification has emphasized the need for practices relating to long span rural joint use. In this connection attention is directed to an article by Messrs. Scholz and Craft on the subject of a trial installation of rural joint use which appears in the November 24 issue of *Electrical World* and the November issue of EEI BULLETIN. Pending the accumulation of more experience in additional trial installations it has not been possible to complete the preparation of a section on Joint Pole Practices for Long Span Rural Joint Use in time for inclusion in Publication M-12. However, such a section will be issued separately as Part 5 of this publication at a later date.

Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Solid" Type (7th Edition) "Oil-Filled" Type (4th Edition).

EEI Pub. M-13. A report prepared by Cable Engineering Section, Committee on Power Distribution of Association of Edison Illuminating Companies, 59 pages. Price $1.00 for single copies; $.85 for ten or more copies.

The purposes of these specifications are to insure the furnishing of cable of high quality and are intended to apply to impregnated paper-insulated, lead-covered cable of the "solid" type which is to be used for the transmission and distribution of electrical energy. They bring up to date and replace earlier specifications on the same subject.

PERSONALS

W. WINANS FREEMAN, whose 56 years of active business life parallels the development of the electric light and power industry, will retire as Vice President of Columbia Gas & Electric Corp. at the end of the year, Columbia's president, Stuart M. Crocker has announced.

"While it was Mr. Freeman's desire to relinquish his duties as an executive officer of the corporation, he has acceded to the board's request that he remain as a Director of the Corporation," Mr. Crocker said, "with the result that Columbia System will continue to have the advantage of Mr. Freeman's years of experience in public utilities and his advice on the affairs of the company."

Mr. Freeman first came to New York in 1889 as secretary to the General Manager of the Edison Electric Illuminating Company of Brooklyn. He witnessed the ground breaking for the first Edison System electric generating station in Brooklyn and served the Brooklyn utility in various capacities for 23 years. When he resigned in 1912 he was Vice President and General Manager.

He became Vice President and General Manager of the Alabama Power Company and was in charge of its prospective program of hydro-electric development throughout Alabama. In 1914 Mr. Freeman became associated with the Columbia Gas and Electric Corp. as a Director and Vice President with Residence in Cincinnati. He assumed chief executive direction of the Union Gas & Electric Company there along with other subsidiary utility companies of the Columbia System.

Mr. Freeman has seen the development of the industry from its early beginnings and was personally acquainted with its pioneers in invention, engineering and finance, including Thomas A. Edison, Charles W. Steinmetz, Dr. Elihu Thompson, William Stanley, Frank W. Sprague, Charles A. Coffin, and many others. He is Vice President of Edison Pioneers, an organization of men associated with Thomas A. Edison or his work prior to 1899.

One of his chief contributions to the industry lay in the promotion of cooperative effort and efficiency as a leader in various industry organizations.

He was President of the Association of Edison Illuminating Companies as early as 1909 and was President of the National Electric Light Association in 1910. From 1920 to 1928 he served continuously as President of the Society for Electric Development, an organization which included equal representation by manufacturers, jobbers, contractors and central station companies of the country. In 1927 he was awarded the James H. McGraw Gold Medal for Cooperation in recognition of his work with the Society.

PAUL O. CANADAY has been appointed vice president and HAROLD F. SANDERS secretary-treasurer of Electric Power & Light Corporation.

Born in Tennessee, Mr. Canaday was formerly treasurer and assistant secretary of Electric Power & Light Corporation, a holding company of the Electric Bond and Share system. He has been associated with system companies almost continuously since 1926 coming to New York in 1938 to join Ebasco Services Incorporated in the budget department. He became assistant treasurer of Electric Power & Light in April, 1944, treasurer and assistant secretary in August, 1944, continuing in that position until his recent elevation to the vice presidency.

Mr. Sanders, a native of Brooklyn, joined Electric Bond and Share Company in 1921, becoming assistant to the secretary treasurer of Electric Power & Light in 1937. He was appointed assistant secretary and assistant treasurer of Electric in November, 1938, secretary in 1944 and continued in this position until his present appointment as secretary treasurer.

TOM P. WALKER, since 1942 President of the Council of Electric Operating Companies with headquarters in Washington, has been elected a vice president of Irving Trust Company, New York, where he will be associated with the extensive business which the bank has with public utility companies.

Mr. Walker was selected by 170 electric operating companies throughout the country to head the organization they formed early in 1942 in order that immediate nationwide cooperation could be achieved for the government in connection with the furtherance of the war. For 12 years prior to accepting that appointment Mr. Walker was president of the Gulf States Utilities Company with headquarters at Beaumont, Texas. Prior to that he had been an executive of leading electric operating companies in several southern states and is widely known in the public utility field.

Appointment of LEROY L. BENEDICT as assistant general supervisor of Consumers Power Company's Electric Production, Transmission and Construction Department, has been announced by D. E. Karn, vice president and general manager.

For the past 25 years Benedict has been division superintendent of the department's western division, with headquarters in Grand Rapids. In his new position he will assist Vice President Frank G. Boyce in supervising the operation and construction of electric plants and transmission facilities throughout the area served by Consumers. He assumed his new duties December 1. His office will be in Jackson.

LEON M. DAY, in charge of safety and operating instruction in the Western Division, has been appointed division superintendent. He will act as superintendent temporarily.

A graduate of Vermontville high school and of Michigan State College, Benedict served with the Michigan Power Company in Lansing from 1910 through 1919. He then joined Consumers and within a few months was appointed superintendent of the Western Division. He is a member of the American Society of Mechanical Engineers and the Michigan Engineering Society and a former president of the Grand Rapids Engineering Society.

The Union Electric Company of Missouri has appointed ROBERT L. COE to the position of Residential Promotion Manager, it was announced by W. L. Berry, Sales Manager, recently.

Mr. Coe, who recently returned from service in the Navy, has been associated with Union Electric since 1929. In 1937 he was appointed Merchandise Manager in which capacity he served until entering the Navy in 1943. In the Navy he saw service in Panama and on the west coast, being discharged November 1, a

Lieutenant. He returned to Union Electric November 12.

In his new position, Mr. Coe will have the responsibility of supervising all residential sales and promotional operations throughout the system, including operations of the Residential Lighting and Service Division, Home Economics Division, Merchandising Division and Dealer Sales Counsellor. In addition to these duties he will temporarily act as Merchandise Manager.

Mr. Coe served as president of the St. Louis Chamber of Commerce Sales Manager's Bureau in 1942 and of the St. Louis Housewares Club in 1941.

Announcement has been made of the promotion of T. G. ALLAN to manager of the dealer section, West Penn Power Company. Mr. Allan replaces W. D. PETERS who resigned to become district manager in the Home Appliance Department of General Mills, Inc.

Mr. Allan has been with West Penn since 1931, starting with the Appliance Department as salesman, and later becoming senior dealer representative. Since 1944 he has been assistant manager of the dealer section, located at Pittsburgh.

J. H. MULLEN, general supervisor of the dealer section, was promoted to assistant manager. Mr. Mullen has been with the Company 21 years, serving as salesman and sales supervisor until the dealer section was organized in 1938 when he became dealer supervisor. Since 1943 he has been general supervisor of the dealer section.

FRANK S. KEELER, for the past two years district manager of Alabama Power Co. at Mobile, has been elected a vice president of the company.

Mr. Keeler is a native of New York and a graduate of Rensselaer Polytechnic Institute, but after military service in World War I he went to Mobile in 1919 and shortly thereafter became an electrician with the Mobile Electric Co. Subsequently he was made superintendent of the meter department and in 1923 was promoted to assistant general superintendent of the company. When Alabama Power Co. acquired the Gulf Electric Co., successor to the Mobile Electric Co., in 1927, Mr. Keeler was appointed division superintendent. He was made Mobile district manager and assistant to the division vice president in 1943.

FRANK G. MACKANESS, formerly of New Orleans, has been appointed agricultural consultant for the Portland (Ore.) General Electric Co. The appointment of Mr. Mackaness is the initial step in a post-war program designed to foster intensified agriculture in the lower Willamette Valley. Mr. Mackaness worked during the war in Haiti for the Societe Haitiano Americane de Development Agricole on U. S. government-sponsored projects to develop supplies of natural rubber. He will join with county agents, Oregon State College and local farm groups to develop latent wealth, and will offer a technical advisory service to customers of the company requesting it.

J. W. CARPENTER, president and general manager of the Texas Power & Light Co., Dallas, has received the honorary degree of doctor of engineering from Southern Methodist University.

LAURENCE A. DUNN has been appointed merchandise manager of the United Illuminating Co., New Haven and Bridgeport, Conn., succeeding BYRON B. SPINNEY, who has resigned to enter the appliance distribution field. Mr. Dunn was merchandise manager of the company's New Haven division until 1942, when he became general storekeeper.

WALTER HEREN has been appointed advertising manager for the Union Electrict Co. of Missouri, succeeding the late W. K. Holland. Mr. Heren joined the company about five years ago as assistant secretary after 20 years of newspaper and public relations work in Kansas City and vicinity.

Announcement has been made by the Alabama Power Co. of the election of L. M. SMITH to the position of vice president.

Mr. Smith, who has been with the company for 22 years, started as a draftsman. Most of his experience has been in the engineering field, but for the past several years he has been engaged in public relations work. He has been director of public relations for Alabama Power for the past year.

S. R. KNAPP, assistant to the vice president in charge of sales of the Connecticut Light & Power Co. since 1941, with headquarters in Waterbury, has been elected chairman of the Interstate Power Club.

A graduate of Cornell University in electrical engineering, Mr. Knapp worked from 1928 to 1931 in the research and general operating departments of Connecticut Light & Power. He was then transferred to the power sales department, continuing in that position until 1937 when he became manager of the New Milford district. It was in November, 1941, that he assumed his present position.

Mr. Knapp has been a member of the industrial power and heating section of the Edison Electric Institute for the past few years and at present is chairman of the sales personnel and training committee of that section.

CHARLES W. E. CLARKE was elected Vice President and Consulting Engineer of United Engineers & Constructors Inc. of Philadelphia at a meeting of the directors on November 27.

Mr. Clarke has specialized in the field of steam engineering practice for the past 35 years, serving as Consulting Engineer with United Engineers & Constructors Inc. since its organization in 1928 and in a similar capacity with Dwight P. Robinson & Company of New York between 1919 and 1928. Prior to this association he was associated with Stone & Webster Engineering Corporation, New York Central Railroad, Sargent & Lundy, Armour and Company, and The Stirling Company.

Mr. Clarke has been a liberal contributor to technical society and engineering publications, and has lectured before many technical schools and societies both here and abroad. Memberships in various technical societies include a Fellowship of American Society of Mechanical Engineers and the Institution of Mechanical Engineers of Great Britain.

A. P. CHAMPLIN has recently assumed the duties of superintendent of electric distribution and transmission of the Southern Indiana Gas & Electric Co., Evansville, to succeed B. V. BOSARD, retired.

GEORGE P. TSCHUMI has been appointed general supervisor of appliance sales and service of Ohio Edison Co. with headquarters at Akron.

The department of which Mr. Tschumi is now the head has general supervision of the merchandise operations of the company, including the standardization of sales policies, planning of sales activ-

ities, training of salesmen, contacts with appliance manufacturers and other matters pertaining to the promotion, sale and service of appliances by the company.

Mr. Tschumi has been an employee of Ohio Edison Co., and its predecessors for more than 23 years, having become identified with the Northern Ohio Traction & Light Co. in 1922. In 1930, following the formation of Ohio Edison Co., he was named merchandise manager for its Akron Division, which also included supervision of appliance service activities. He continued to serve in this capacity until his present promotion.

G. H. THAYER, who has been acting superintendent of appliance sales and service in the Youngstown Division of the company, has succeeded Mr. Tschumi as superintendent of appliance sales and service in the Akron Division.

RICHARD LINCOLN, executive assistant to John T. Ward, vice president, Boston Edison Co., and formerly superintendent of the merchandising department, has been transferred to the position of executive assistant to the company's newly appointed general sales manager, GEORGE C. KING. RALPH A. POWERS has been appointed head of the newly organized meter service division, which combines the meter technical and records divisions. He has been succeeded in his late position as head of the meter and installations division of the transmission and distribution department by RALPH F. LORD.

Significance Tests

(*Continued from page* 363)

How many of us may be living in a "fool's paradise" as we view with self-satisfied pride one or more years without a fatal accident and then go on to persuade ourselves that most of this fuss about fatalities is for the other fellow? The inescapable conclusion is that a company may, in fact, be living and working every day among far more than its share of fatal accident producing causes and yet, due to limited working exposure, may not have had those causes line up in just the sequence or combination needed to produce the dread result.

There is a sure way to progress. Lacking statistical evidence to the contrary, let us assume that our freedom from fatal accidents may have been fortuitous, and then forever wage war upon the causes of fatal accidents as devoloped from our own experience plus the highly reliable experience of the industry of which we are a part.

CONVENTIONS AND MEETINGS

DECEMBER

4-7 National Association of Railroad and Utilities Commissioners, Macfadden-Deauville Hotel, Miami Beach, Fla.

5-7 Southeastern Electric Exchange, Commercial Section, Atlanta Biltmore Hotel, Atlanta, Ga.

7-8 Pacific Coast Electrical Association, Joint Meeting Business Development and Operating Economics Sections, Hotel Californian, Fresno, Calif.

17-18 General Accounting Committee, Taxation Committee, Plant and Property Records Committee, Plant Accounting Committee, EEI, Hotel Cleveland, Cleveland, Ohio.

JANUARY

21-25 American Institute of Electrical Engineers, New York, N. Y.

FEBRUARY

4-5 National Association of Purchasing Agents, Public Utility Buyers' Group, Midwinter Convention, Edgewater Beach Hotel, Chicago, Ill.

4-5 Prime Movers Committee, EEI, St. Louis, Mo.

6-7 Pennsylvania Electric Association, System Operation Committee, Roosevelt Hotel, Pittsburgh, Pa.

7-8 Accident Prevention Committee, EEI, Deshler Wallick Hotel, Columbus, Ohio.

11-12 Canadian Electrical Association, Winter Meeting, Chateau Frontenac, Quebec City, Que., Can.

13-14 Missouri Valley Electric Association, Power Sales Conference, Hotel Continental, Kansas City, Mo.

14-15 Pennsylvania Electric Association, Electrical Equipment Committee, Roosevelt Hotel, Pittsburgh, Pa.

18-19 Transmission and Distribution Committee, EEI, Netherland Plaza Hotel, Cincinnati, Ohio.

20-21 Electrical Equipment Committee, EEI, Netherland Plaza Hotel, Cincinnati, Ohio.

APRIL

2-4 General Sales Conference, EEI, Edgewater Beach Hotel, Chicago, Ill.

10-12 Missouri Valley Electric Association, Engineering Conference, Hotel Continental, Kansas City, Mo.

MAY

28-29 Pennsylvania Electric Association, Engineering Section, Penn Harris Hotel, Pittsburgh, Pa.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF MARCH 3, 1933

Of EDISON ELECTRIC INSTITUTE BULLETIN, published monthly at Philadelphia, Pa., for October, 1945.

State of New York.
County of New York.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Wilgar Coleman, who, having been duly sworn according to law, deposes and says that he is the Editor of the EDISON ELECTRIC INSTITUTE BULLETIN, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management . . . etc., of the aforesaid publication for the date shown in the above caption, required by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations . . . to wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are: Publisher, EDISON ELECTRIC INSTITUTE, 420 Lexington Avenue, New York City; Editor, Wilgar Coleman, 420 Lexington Avenue, New York City; Managing Editor, none; Business Manager, none.

2. That the owners are EDISON ELECTRIC INSTITUTE—not incorporated—trade association; C. W. Kellogg, President, 420 Lexington Avenue, N. Y. C.; Gilbert W. Chapman, Treasurer, American Water Works & Electric Co., N. Y.; Mae B. Woods, Secretary, 420 Lexington Avenue, N. Y. C

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Sworn to and subscribed before me this 26th day of November, 1945.

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